11.6.3 Results of Financial Analysis

(1) Summarized Results of Financial Analysis

Summary of financial analyses is shown in Table 11-9. Outputs processed by the computer such as profit and loss statement, cash flow statement, balance sheet, etc. are attached to the end of this chapter.

Table 11-9 Summary of Financial Analysis

Item \ Case		IRROI	IRROE
Total Investment	(US$1,000)	59,011 *1	60,073
Project Funding			
Equity	(US$1,000)	59,011	7,732
Debt	(US$1,000)	--	52,341
Raw Material Price			
Rich Gas	(US$/$10^3$ SCF)	0.209	0.209
Product Price			
LPG	(US$/T)	140	140
Naphtha	(US$/T)	225	225
Lean Gas	(US$/$10^3$ SCF)	0.209	0.209
Annual Revenue			
Average Annual	(US$1,000)	11,564	11,564
Net Profit			
Average Annual	(US$1,000)	6,049	6,049
Unit	(US$/T-LPG)	99.2	99.2
Profit Before Tax/CTS			
Average Annual	(US$1,000)	3,640	2,318 *3
Unit	(US$/T-LPG)	59.7	38.0 *3
Tax/CTS*2			
Average Annual	(US$1,000)	1,337	940
Unit	(US$/T-LPG)	21.9	15.4
Profit After Tax/CTS			
Average Annual	(US$1,000)	2,303	1,378 *3
Unit	(US$/T-LPG)	37.8	22.6 *3
IRR after Tax/CTS	(%)	5.11	34.32
before Tax/CTS	(%)	7.90	45.69
Payback Period	(Years)	13.1	2.6

*1 : Excluding IDC.
*2 : Including Import Duty.
*3 : Average Annual during operating period.

(2) Indicator of Profitability of the Project

1) IRR

As shown in the attached computer outputs, the calculated results for IRR and payback period of the Project are as follows:

		IRROI	IRROE
IRR	(before tax/CTS)	7.90%	45.69%
	(after tax/CTS)	5.11%	34.32%
Payback period	(after tax/CTS)	13.1 years	2.6 years

When discussing the profitability of the Project, it is pointed out that the conditions of the long-term loan will have a predominent impact on viability of the Project.

2) Cash flow on the Project

As shown in cash flow statements of the attached computer outputs, the Project will not be short of funds throughout the whole operating period for IRROE case which is introduced long-term loan, and it is a matter of course in IRROI case.

3) Production cost

Production cost is calculated by adding depreciation cost and interest on loan to the operation cost shown in Table 11-8. Production cost in each year is shown in Table 11-10.

Table 11-10 Production Cost

(US$1,000)

Year	Break-down of Production Cost			Production Cost	
	Operating Cost	Depreciation	Interest	Annual	Unit* US$/T-LPG
1	5,515	2,740	1,439	9,694	158.9
2	5,515	2,740	1,439	9,694	158.9
3	5,515	2,740	1,439	9,694	158.9
4	5,515	2,740	1,439	9,694	158.9
5	5,515	2,740	1,439	9,694	158.9
6	5,515	2,370	1,439	9,324	152.9
7	5,515	2,370	1,439	9,324	152.9
8	5,515	2,370	1,439	9,324	152.9
9	5,515	2,370	1,439	9,324	152.9
10	5,515	2,370	1,439	9,324	152.9
11	5,515	2,370	1,421	9,306	152.6
12	5,515	2,370	1,349	9,234	151.4
13	5,515	2,370	1,277	9,162	150.2
14	5,515	2,370	1,205	9,090	149.0
15	5,515	2,370	1,134	9,019	147.9
16	5,515	2,370	1,062	8,947	146.7
17	5,515	2,370	990	8,875	145.5
18	5,515	2,370	918	8,803	144.3
19	5,515	2,370	846	8,731	143.1
20	5,515	2,370	774	8,659	142.0

* Unit production cost is nominal production cost per unit weight of the main product, obtained by dividing annual production cost by amount of annual production of LPG.

Since the sales prices are assumed US$140/T for the main product LPG, and US$225/T for naphtha and Kyat 1.80/10^3 SCF for lean gas, the Project will be able to make sales revenue enough to secure the profit and pay the tax/CTS indicated in Table 11-9.

4) Other financial indicators

DSR (Debt Service Coverage Ratio) indicating solvency of loan, and BEP (Break Even Point, capacity utilization) for the Project are indicated in Table 11-11.
Each indicator is obtainable from the following formulas respectively.

i) Profit after tax/CTS on sales revenue
Profit after tax/CTS/Sales revenue

ii) Debt service coverage ratio
(Net income after tax/CTS + Depreciation + Interest)/(Repayment + Interest)

iii) Profit B.E.P. (Break Even Point) ..... Capacity utilization

$$\frac{f}{(r_0 - v_0)}$$

where,

f: Fixed Op. Cost + Depreciation + Interest

r_0: Sales Revenue at full capacity

v_0: Variable Op. Cost at full capacity

Table 11-11 Financial Indicators (IRROE Case)

Year	Profit after Tax on Sales Revenue	Debt Service Coverage Ratio	Profit B.E.T. (Capacity Utilization)
	(%)		
1	11.32	3.81	0.77
2	2.86	3.13	0.77
3	2.86	3.13	0.77
4	2.86	3.13	0.77
5	2.86	3.13	0.77
6	5.10	3.06	0.72
7	13.60	3.74	0.72
8	13.60	3.74	0.72
9	13.60	3.74	0.72
10	13.60	3.74	0.72
11	13.66	1.33	0.72
12	14.10	1.35	0.71
13	14.54	1.37	0.70
14	14.98	1.39	0.69
15	15.41	1.41	0.68
16	15.84	1.43	0.67
17	16.28	1.45	0.66
18	16.72	1.48	0.65
19	17.15	1.50	0.65
20	17.59	1.53	0.64
Average	11.93	2.43	0.71

As shown in Table 11-11 above, the average value of DSR extending over 20 years is 2.43, and exceeding 1.33 even after the 11th year when repayment of loan will start. B.E.P. (capacity utilization) is 77% from the first operation year, and showing the lower figures after 6th year when deferred payment of import duty will be completed, that means the Project will have sound financial status even if operation rate falls down around 70 percent of capacity.

11.6.4 Sensitivity Analysis

With the above-mentioned case of financial analysis as the Base Case, a study is made to evaluate the influence exerted by any change of a condition established to the Base Case on the profitability of the Project.

(1) Establishment of parameters

The following parameters and values of variability are established.

1) Sales prices of LPG and by-product naphtha

Variation of ±10% to the sales prices of the Base Case, that is, LPG at US$140/T and by-product naphtha at US$225/T.

2) Plant construction cost

±10% variation for the plant construction cost of US$58,198,000 (the Base Case).

3) Financing conditions on long-term loan

The following two financing conditions are studied to grasp the influence exerted by the conditions of long-term loan on the profitability of the Project.

Case	Rate of Interest	Terms of Repayment	Installments of Repayment	Grace Period of Repayment
A	5.0%	10 years	20 installments	None
B	7.8%	10 years	20 installments	None

4) Variable operating cost

Variation of ±10% to the Base Case.

5) Onstream factor

80% of operation rate for the first year, 90% of operation rate for the second year, and 100% of operation rate after the third year compared with 100% of operation rate from the first year of the Base Case.

6) Exemption of import duty

Exemption of import duty, which is imposed in the Base Case.

7) Exemption of CTS

Exemption of CTS. CTS is imposed for the Project for the Base Case calculation.

(2) Results of Sensitivity Analysis

The results of sensitivity analysis are shown in Table 11-12.

Table 11-12 Summary of Sensitivity Analyses

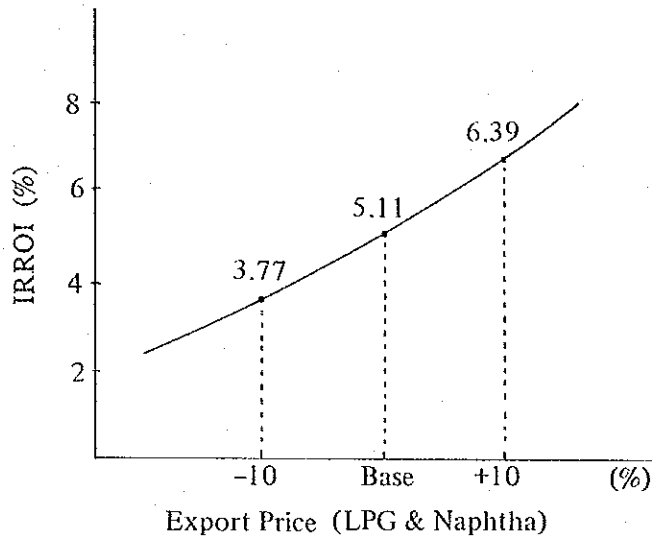
Financial Parameter and Variation	IRR (%)			Payback Period (Years)
	ROI or ROE	After Tax/CTS	Before Tax/CTS	
1. Sales Price * (US$/T)	ROI			
· -10%		3.77	6.10	15.1
· Base		5.11	7.90	13.1
· +10%		6.39	9.61	11.6
2. Plant Cost (US$1,000)	ROI			
· 52,378 (-10%)		6.02	9.11	12.0
· 58,198 (Base)		5.11	7.90	13.1
· 64,018 (+10%)		4.33	6.87	14.2
3. Financing Conditions	ROE			
· Base		34.32	45.69	2.6
· Case A		8.08	14.84	17.1
· Case B		4.22	11.96	—
4. Variable Operating Cost (US$1,000)	ROI			
· 3,223 (-10%)		5.61	8.57	12.5
· 3,582 (Base)		5.11	7.90	13.1
· 3,940 (+10%)		4.60	7.22	13.8
5. Onstream Factor (%) 1st Yr.: 80, 2nd Yr.: 90, from 3rd Yr.: 100	ROI	4.86	7.50	13.5
6. Exemption of Import Duty	ROI	5.78	7.90	12.1
	ROE	40.09	45.69	2.2
7. Exemption of CTS	ROI	6.93	7.90	11.1
	ROE	37.81	45.69	2.4

* Price variation of LPG and Naphtha.

1) Export prices of LPG and by-product naphtha

The change of the value of IRROI caused by the fluctuations of the export prices of LPG and naphtha to the Base Case by ±10% is shown in Fig. 11-1.

Fig. 11-1 IRROI vs. Product Export Prices



The export prices of LPG and naphtha are liable to fluctuate according to world energy market conditions and the range of fluctuation in their prices may be widen considerably under certain circumstances.

As shown in the above figure, the fluctuations of product export prices have important effects upon the profitability of the Project. In case actual sales prices of LPG and naphtha based on market prices exceed the established prices by 10% respectively, the value of IRROI after tax/CTS amounts to 6.39% increasing by 1.28%.

In the contrary case where actual prices are below the established prices by 10%, IRROI falls to 3.77%, a low figure, decreasing by 1.34%.

However, the export prices (LPG at US$140/T, by-product naphtha at US$225/T) established in the Base Case are based on recent dull market conditions of energy and there is every possibility the export prices will rise in the medium-term or long-term.

Consequently, there is an expectation that the profitability of the Project be improved considerably in the future.

2) Plant construction cost

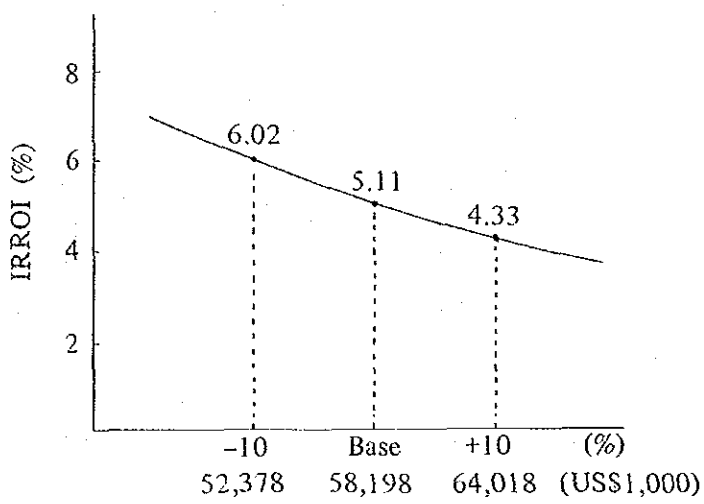
IRROI will change as shown in Fig. 11-2 by variation of ±10% of the plant construction cost.

In case of occurrence of such unforeseen happenings as delay of construction schedule, unexpected changes of the economic conditions and other problems during the period of construction, there is a possibility that construction cost goes beyond the original estimated cost.

In case the plant construction cost exceeds the estimated cost by 10%, the value of IRROI after tax/CTS falls to 4.33% and worsens the profit situation of the Project.

Since the investment estimate for the plant construction cost includes a reasonable amount of contingency, there is little possibility of over run of the original investment estimate.

Fig. 11-2 IRROI vs. Plant Cost



3) Financing conditions on long-term loan

Financing conditions on long-term loan are the element having the most important influence upon the profitability of the Project.

The changes of IRROE and payback period caused by the change of financing conditions on long-term loan are shown in Table 11-13.

Table 11-13 IRROE, Payback Period

Case		Base Case	Case A	Case B
Financial Conditions	Interest	2.75% p.a.	5.00% p.a.	7.80% p.a.
	Repayment	20 years	10 years	10 years
	Grace-Period	10 years	0	0
IRROE after Tax/CTS (%)		34.32	8.08	4.22
IRROE before Tax/CTS (%)		45.69	14.84	11.96
Payback Payback Period (Years)		2.6	17.1	–

The values of IRROE and payback period of Case A and Case B under harder conditions than the Base Case will become worse predominantly, thus making the management of the Project practically unsuccessful. Namely, both of Case A and Case B will necessitate borrowing of short-term loan to cover shortage of funds from the first operational year. The shortage of funds is due to the fact that annual repayment amount of principal and interest of long-term loan exceeds US$6,049,000 of operating cash flow (Sales revenue – Operating cost).

Thus, the amount of short-term loan will increase year after year and endanger the base of the Project. After all, cash flow of Case A will turn into positive in the 16th year, but accumulation of funds surplus is small and rate of return is very low. The cash flow of Case B will turn into positive in the 19th year, but the investments will be irredeemable. As a matter of fact, implementation of the Project under such financing conditions will not be successful.

On the other hand, good profitability of 34.32% of IRROE and only 2.6 years of payback period is expected under the financing conditions set forth in the Base Case.

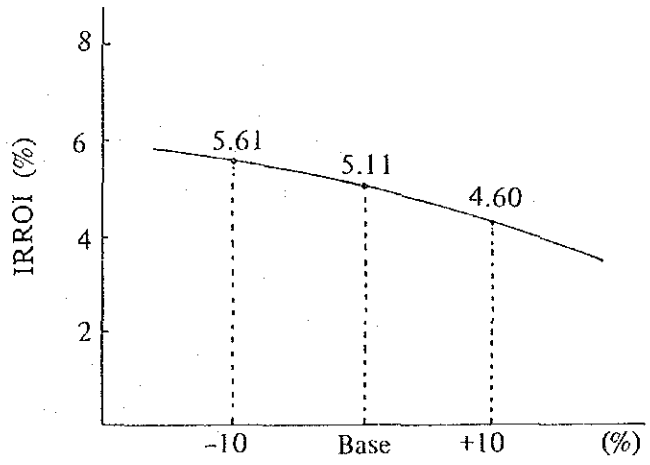
In this case, it is possible to pay import duty and contribution to state by granting 10 year grace period for repaying the principal. The Project in this case will not encounter shortages of funds throughout the whole operation years and accumulate US$23,788,000 of

funds surplus from the Project. The debt service ratio of the Project will be 2.43 in average as well as 1.33 in the lowest. It is indicating its sound financial conditions. The Project could only be promoted if and when such a favorable loan conditions as prescribed in the Base Case are granted.

4) Variable operating cost

Effect of variable operating cost to IRROI is shown in Fig. 11-3.
If the variable operating cost increases by 10% compared with the Base Case, the IRROI after tax/CTS will decrease to 4.60%.
Since the feed gas cost contributes most to the variable operating cost, it is desirable to establish some kind of pricing formulas for feed gas in long run.

Fig. 11-3 IRROI vs. Variable Operating Cost



5) Operation rate

There is a possibility that the operation rate of the plant may decline due to market situation or operational matters of plant operation.
If the case of 80% operation in the first year, 90% operation in the

second year, and 100% in the third year and thereafter is compared with the Base Case, IRROI after tax/CTS will become 4.86% by decrease of 0.25%.

6) Exemption of import duty

Exemption of import duty will increase profitability of the Project in the financial study. If import duty is exempted for this Project, the IRROI after tax/CTS will be 5.78% by increase of 0.67%.

7) Exemption of CTS

Although the profitability of the Project is not so high, it is anticipated that the Project will earn the profits constantly, so it is possible to pay CTS from the first year of operation.

As the Project pays an important role in the social and industrial development of Burma, it can be said that the Project has a high public interest.

If the governmental and institutional supports are given to the Project such as an exemption on CTS, the IRROI will greatly be improved to 6.93% and therefore it is most desirable that incentive measures will be given to the Project.

11.7 Evaluation

Hereunder described are evaluation and conclusions for the Phase III LPG Project after exercising overall judgement on the results of a series of financial analyses conducted in the preceding sections.

(1) The IRROI after tax/CTS of the Project is 5.11%, and this indicates that the profitability of the Project itself may not be so high, but not so desperately low.

(2) The position of funds and financial situation of the Project are sound, and hence the Project is financially viable.

(3) The IRROE after tax/CTS is 34.32%, if capital procurement under the soft financing conditions of long-term loan presumed in this report is ascertained affirmative.

(4) Owing to this capital procurement, not only improvement of the profitability and financial situation of the Project are expected but also the realization of the Project will achieve various national goals and targets being proclaimed by the Government of Burma.

(5) As mentioned above, success or failure of capital procurement under the soft financing conditions as described has a very important influence upon the Project for the purposes of enhancing financial situation and improving IRR.

(6) It is concluded, therefore, that the Project is worthy of implementation taking the results of the abovementioned financial analysis and the economic effects brought on Burma through the realization of the Project as indicated in the next chapter "ECONOMIC EVALUATION" into consideration.

****

FINANCIAL ANALYSIS

PROJECT : BURMA LPG PHASE-III

SITE : KYANGIN

COMMENT : BASE CASE (ROI)

DATE : 1985/07/10

****

NOTE : THE WORDING IN THE COMPUTER OUTPUTS CORRESPONDS TO THAT IN THE MAIN BODY OF THIS REPORT IN THE FOLLOWING MANNER :

(COMPUTER OUTPUTS)				(REPORT)
	INCOME TAX	<----->	CTS	
	TAXABLE INCOME	<----->	NET INCOME B/CTS	
	B/TAX	<----->	BEFORE TAX/CTS	
	A/TAX	<----->	AFTER TAX/CTS	

* CONTROL DATA ----> CALCULATE ROI

* INVESTMENT ------> INVESTMENT COST IN 1000 US$
DISBURSEMENT SCHEDULE IN %

	INVESTMENT	DISBURSEMENT SCHEDULE -2YR	-1YR
PLANT INVESTMENT	56198.00	--	--
EQUIP. & MACHIN	50872.00	50.00	50.00
CIVIL & BUILDIN	7326.00	40.00	60.00
PRE-OPERATION COS	785.00	0.00	100.00
INITIAL W/C	29.00	0.00	100.00

* PRODUCTION ------> CAPACITY = PER YEAR
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

PRODUCT	CAPACITY	UNIT PRICE
LPG	61000.000 TON	140.00 PER TON
NAPHTA	3200.000 TON	225.00 PER TON
LEAN GAS	1.101E+07 MSCF	0.21 PER MSCF

* S-T LOAN --------> STARTS 1 : NEXT YEAR 2 : WHEN CASH POSITION POSITIVE
METHOD 1 : CONSTANT AMOUNT OF PRINCIPAL 2 : CONSTANT AMOUNT OF PRINCIPAL AND INTEREST

LOAN CONDITION	INTEREST (%PA)	INSTALL. (YRS)	LIMIT (1000 US$)	REPAYMENT STARTS	REPAYMENT METHOD
S-T LOAN 1	5.00	1	1.000E+10	1	1

* DPR/AMT ---------> METHOD 1 : STRAIGHT LINE 2 : DECLINING BALANCE 3 : RATE GIVEN

	METHOD	YEARS	SALV.(%)	GRACE(YR)
EQUIP. & MACHINERY	1	20	12.00	0
CIVIL & BUILDING	1	50	10.00	0
PRE-OPERATION COST	1	5	0.00	0

* INFLATION -------> NO INFLATION

* INCREASING W/C --> PAID AT THE YEAR WHEN STR'M FCTR CHANGES

INCREASING W/C : 1301 (1000 US$/YR)

* FIXED OPE-COST --> LABOR COST : 348 (1000 US$/YR)
MAINTENANCE : 1231 (1000 US$/YR)
INSURANCE : 180 (1000 US$/YR)
PLANT OVERHEAD : 50.00 % OF LABOR COST

LABOR COST	CATEGORY	NUMBER	UNIT COST (US$/YR/PRSN)
	LABOR COST	475	733

* RAW MATERIAL ----> UNIT CONSUMPTION = PER TON OF LPG
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

RAW MATERIAL	UNIT CONSUMPTION	UNIT PRICE
RICH GAS	205.574 MSCF	0.21 PER MSCF

* VAR. OPE-COST ---> UNIT CONSUMPTION = PER TON OF LPG
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

VAR. OPE-COST	UNIT CONSUMPTION	UNIT PRICE
ELECTRICITY	406.700 KWH	0.01 PER KWH
WATER	0.080 NM3	0.01 PER NM3
CHEMICALS	2.885 US$	---
RIVER TRANSPORT	7.151 US$	---

* INCOME TAX ------> GRACE PERIOD (YEARS) : 0 NO TAX FOR (-) PROFIT B/T

PROGRESSIVE TAX	RANGE(1000 US)	TAX RATE(%)
	0.00 - 5843.95	30.00
	5843.95 - INFINATE	40.00

* STREAM FCTR -----> ON-STREAM FACTOR IN %

1-20 YR
100.00

RUN - 1 ROI A/TAX (%) : 5.11 ROI B/TAX (%) : 7.90

PAYBACK FOR ROI A/TAX (YRS) : 13.1

**CAPITAL INVESTMENT COST : 59012.000 1000 US$

PLANT INVESTMENT	: 58198.000	PRE-OPERATION COST	: 785.000
INITIAL W/C	: 29.000		

**PRODUCT UNIT PRICE		**RAW MATERIAL UNIT PRICE	
LPG	: 140.000 US$/TON	RICH GAS	: 0.209 US$/MSCF
NAPHTA	: 225.000 US$/TON		
LEAN GAS	: 0.209 US$/MSCF		

**ON-STREAM FACTOR (%)

1-20 YR
100.00

**INFLATION (% P.A) NO INFLATION

ROI A/TAX (%) : 5.11 ROI B/TAX (%) : 7.90 PAYBACK FOR ROI A/TAX (YRS) : 13.1

(PROFIT LOSS STATEMENT)

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	--
ANNUAL REVENUE	--	--	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	231283
OPERATING COST	--	--	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	110318
RAW MATERIAL	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	52493
VARIABLE OPE-COST	--	--	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	19165
FIXED OPE-COST	--	--	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	38660
CASH INCOME	--	--	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	120965
DEPRECIATION	--	--	2527	2527	2527	2527	2527	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	48190
INTEREST	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET INCOME B/TAX	--	--	3521	3521	3521	3521	3521	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	72776
IMPORT DUTY	--	--	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6985
INCOME TAX	--	--	1056	637	637	637	637	684	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	19737
NET INCOME A/TAX	--	--	2465	1487	1487	1487	1487	1597	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	46054

(CASH FLOW TABLE)

SOURCE OF FUNDS																							
CASH INCOME	0	0	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	120965
PAID-IN CAPITAL	28366	30646	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59012
TOTAL SOURCE	28366	30646	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	179977
APPLICATION OF FUNDS																							
CAPITAL INVESTMENT	28366	30646	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59012
PLANT INVESTMENT	28366	29832	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58198
PRE-OPERATION COST	0	785	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	785
INITIAL W/C	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
DEBT SERVICE PAYMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCREASING W/C	0	0	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1301
IMPORT DUTY	0	0	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6985
INCOME TAX	0	0	1056	637	637	637	637	684	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	19737
CASH INCREASE	-28366	-30646	3691	4014	4014	4014	4014	3967	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	33930
TOTAL APPLICATION	28366	30646	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	179977
CUMULATIVE CASH INC.	-28366	-59012	-55321	-51307	-47293	-43279	-39265	-35298	-30353	-25408	-20463	-15518	-10574	-5629	-684	4261	9206	14151	19096	24041	28985	33930	33930
W/C RETURN & SALVAGE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12123	12123
CASH FLOW (ROI A/TAX)	-28366	-30646	3691	4014	4014	4014	4014	3967	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	4945	17068	46054
ROI A/TAX (%)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.11	5.11	5.11	5.11	5.11	5.11	5.11	--
CASH FLOW (ROI B/TAX)	-28366	-30646	4747	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	6048	18172	72776
ROI B/TAX (%)	--	--	--	--	--	--	--	--	--	--	--	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	--

*** CAPITAL INVESTMENT COST ***

PROJECT YEAR	-2	-1	TOTAL
CAPITAL INVESTMENT	28366	30646	5.9E+04
PLANT INVESTMENT	28366	29832	5.8E+04
EQUIP. & MACHINERY	25436	25436	5.1E+04
CIVIL & BUILDING	2930	4396	7326.00
PRE-OPERATION COST	0	785	785.00
INITIAL W/C	0	29	29.00

*** INCREASING W/C ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	--
INCREASING W/C	--	--	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1301.00
INCREASING W/C	--	--	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1301.00

*** DEPRECIATION/AMORTIZATION ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
DPR./AMT.	--	--	2527	2527	2527	2527	2527	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	4.8E+04
DEPRECIATION	--	--	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	4.7E+04
EQUIP. & MACHINERY	--	--	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	4.5E+04
CIVIL & BUILDING	--	--	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	2637.36
AMORTIZATION	--	--	157	157	157	157	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	785.00
PRE-OPERATION COST	--	--	157	157	157	157	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	785.00

*** ANNUAL REVENUE ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	--
ANNUAL REVENUE	--	--	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	2.3E+05
LPG	--	--	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	1.7E+05
CAPA.(TON/YEAR)	--	--	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	--
UNIT PRICE(US$/TON)	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	--
NAPHTA	--	--	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	1.4E+04
CAPA.(TON/YEAR)	--	--	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	--
UNIT PRICE(US$/TON)	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	--
LEAN GAS	--	--	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	4.6E+04
CAPA.(MSCF/YEAR)	--	--	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	--
UNIT PRICE(US$/MSCF)	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	--

*** RAW MATERIAL COST ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	--
RAW MATERIAL COST	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	5.2E+04
RICH GAS	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	5.2E+04
UNIT CONS.(MSCF/TON)	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	--
UNIT PRICE(US$/MSCF)	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	--

*** VARIABLE OPE-COST **********

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	--
VARIABLE OPE-COST	--	--	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	1.9E+04
ELECTRICITY	--	--	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	6944.15
UNIT CONS.(KWH/TON)	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	--
UNIT PRICE(US$/KWH)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
WATER	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.25
UNIT CONS.(NM3/TON)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	--
UNIT PRICE(US$/NM3)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
CHEMICALS	--	--	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	3519.70
UNIT CONS.(US$/TON)	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	--
RIVER TRANSPORTATION	--	--	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	8699.82
UNIT CONS.(US$/TON)	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	--

*** FIXED OPE-COST **********

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
FIXED OPE-COST	--	--	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	3.9E+04
LABOR COST	--	--	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	6960.00
MAINTENANCE	--	--	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	2.5E+04
INSURANCE	--	--	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	3600.00
PLANT OVERHEAD	--	--	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	3480.00

*** INCOME TAX **********

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
NET INCOME B/TAX __	--	--	3521	3521	3521	3521	3521	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	7.3E+04
IMPORT DUTY	--	--	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6985.00
TAXABLE INCOME	--	--	3521	2124	2124	2124	2124	2281	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	3678	6.6E+04
INCOME TAX RATE (%)	--	--	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	--
INCOME TAX	--	--	1056	637	637	637	637	684	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	1103	2.0E+04
NET INCOME A/TAX	--	--	2465	1487	1487	1487	1487	1597	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	2575	4.6E+04

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FINANCIAL ANALYSIS

PROJECT : BURMA LPG PHASE-III

SITE : KYANGIN

COMMENT : BASE CASE (ROE)

DATE : 1985/07/10

****

NOTE : THE WORDING IN THE COMPUTER OUTPUTS CORRESPONDS TO THAT IN THE MAIN BODY OF THIS REPORT IN THE FOLLOWING MANNER :

(COMPUTER OUTPUTS)				(REPORT)
	INCOME TAX	<----->	CTS	
	TAXABLE INCOME	<----->	NET INCOME B/CTS	
	B/TAX	<----->	BEFORE TAX/CTS	
	A/TAX	<----->	AFTER TAX/CTS	

* CONTROL DATA ----> CALCULATE ROE

* INVESTMENT ------> INVESTMENT COST IN 1000 US$
DISBURSEMENT SCHEDULE IN %

	INVESTMENT	DISBURSEMENT SCHEDULE -2YR	-1YR
PLANT INVESTMENT	58198.00	--	--
EQUIP. & MACHIN	50872.00	50.00	50.00
CIVIL & BUILDIN	7326.00	40.00	60.00
PRE-OPERATION COS	785.00	0.00	100.00
INITIAL W/C	29.00	0.00	100.00
IDC		TO BE CALCULATED BY COMPUTER	

* PRODUCTION ------> CAPACITY = PER YEAR
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

PRODUCT	CAPACITY	UNIT PRICE
LPG	61000.000 TON	140.00 PER TON
NAPHTA	3200.000 TON	225.00 PER TON
LEAN GAS	1.101E+07 MSCF	0.21 PER MSCF

* VAR. OPE-COST ---> UNIT CONSUMPTION = PER TON OF LPG
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

VAR. OPE-COST	UNIT CONSUMPTION	UNIT PRICE
ELECTRICITY	406.700 KWH	0.01 PER KWH
WATER	0.080 NM3	0.01 PER NM3
CHEMICALS	2.885 US$	---
RIVER TRANSPORT	7.131 US$	---

* S-T LOAN --------> STARTS 1 : NEXT YEAR 2 : WHEN CASH POSITION POSITIVE
METHOD 1 : CONSTANT AMOUNT OF PRINCIPAL 2 : CONSTANT AMOUNT OF PRINCIPAL AND INTEREST

LOAN CONDITION	INTEREST (%PA)	INSTALL. (YRS)	LIMIT (1000 US$)	REPAYMENT STARTS	REPAYMENT METHOD
S-T LOAN	5.00	1	1.000E+10	1	1

* INCOME TAX ------> GRACE PERIOD (YEARS) : 0 NO TAX FOR (-) PROFIT B/T

PROGRESSIVE TAX	RANGE(1000 US)	TAX RATE(%)
	0.00 - 5843.95	30.00
	5843.95 - INFINATE	40.00

* INFLATION -------> NO INFLATION

* INCREASING W/C --> PAID AT THE YEAR WHEN STR'M FCTR CHANGES

INCREASING W/C : 1301 (1000 US$/YR)

* EQUITY/DEBT ----->

	E / D
PLANT INVESTMENT	12.6/ 87.4
PRE-OPERATION CO	48.2/ 51.8
INITIAL W/C	100.0/ 0.0
IDC	0.0/100.0

* FIXED OPE-COST --> LABOR COST : 348 (1000 US$/YR)
MAINTENANCE : 1231 (1000 US$/YR)
INSURANCE : 180 (1000 US$/YR)
PLANT OVERHEAD : 50.00 % OF LABOR COST

LABOR COST	CATEGORY	NUMBER	UNIT COST (US$/YR/PRSN)
	LABOR COST	475	733

* RAW MATERIAL ----> UNIT CONSUMPTION = PER TON OF LPG
UNIT PRICE = IN 1989 US$ (PROJECT START YEAR)

RAW MATERIAL	UNIT CONSUMPTION	UNIT PRICE
RICH GAS	205.574 MSCF	0.21 PER MSCF

* L-T LOAN --------> METHOD 1 : CONSTANT AMOUNT OF PRINCIPAL 2 : CONSTANT AMOUNT OF PRINCIPAL AND INTEREST
GRACE PERIOD = YEARS AFTER OPERATION

LOAN CONDITION	GRACE (YRS)	INTEREST (%PA)	INSTALL. (YRS)	REPAYMENT METHOD	PERIOD (MNTH)
L-T LOAN	10	2.75	20	1	6

* DPR/AMT ---------> METHOD 1 : STRAIGHT LINE 2 : DECLINING BALANCE 3 : RATE GIVEN

	METHOD	YEARS	SALV.(%)	GRACE(YR)
EQUIP. & MACHINERY	1	20	12.00	0
CIVIL & BUILDING	1	50	10.00	0
PRE-OPERATION COST	1	5	0.00	0
IDC	1	5	0.00	0

* STREAM FCTR -----> ON-STREAM FACTOR IN %

1-20 YR
100.00

RUN - 1

ROI A/TAX (%) : 5.11
ROE A/TAX (%) : 34.32

ROI B/TAX (%) : 7.90
ROE B/TAX (%) : 45.69

PAYBACK FOR ROI A/TAX (YRS) : 13.1

PAYBACK FOR ROE A/TAX (YRS) : 2.6

**CAPITAL INVESTMENT COST : 60073.700 1000 US$

PLANT INVESTMENT	: 58198.000	PRE-OPERATION COST	: 785.000
INITIAL W/C	: 29.000	IDC	: 1061.680

**PRODUCT UNIT PRICE

LPG	: 140.000 US$/TON	RICH GAS	: 0.209 US$/MSCF
NAPHTA	: 225.000 US$/TON		
LEAN GAS	: 0.209 US$/MSCF		

**RAW MATERIAL UNIT PRICE

**EQUITY/DEBT RATIO (%)

PLANT INVESTMENT	: 12.59 / 87.41	PRE-OPERATION COST	: 48.15 / 51.85
INITIAL W/C	: 100.00 / 0.00	IDC	: 0.00 / 100.00

**ON-STREAM FACTOR (%)

1-20 YR
100.00

**INFLATION (% P.A) NO INFLATION

ROI A/TAX (%) : 5.11 ROI B/TAX (%) : 7.90 PAYBACK FOR ROI A/TAX (YRS) : 13.1
ROE A/TAX (%) : 34.32 ROE B/TAX (%) : 45.69 PAYBACK FOR ROE A/TAX (YRS) : 2.6

(PROFIT LOSS STATEMENT)

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
ANNUAL REVENUE	--	--	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	0	0	0
OPERATING COST	--	--	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	5515	0	0	0
RAW MATERIAL	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	0	0	0
VARIABLE OPE-COST	--	--	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	0	0	0
FIXED OPE-COST	--	--	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	0	0	0
CASH INCOME	--	--	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	0	0	0
DPR./AMT.	--	--	2740	2740	2740	2740	2740	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	0	0	0
INTEREST	--	--	1439	1439	1439	1439	1439	1439	1439	1439	1439	1439	1421	1349	1277	1205	1134	1062	990	918	846	774	702	630	558
LONG TERM LOAN	--	--	1439	1439	1439	1439	1439	1439	1439	1439	1439	1439	1421	1349	1277	1205	1134	1062	990	918	846	774	702	630	558
NET INCOME B/TAX	--	--	1870	1870	1870	1870	1870	2240	2240	2240	2240	2240	2258	2330	2402	2474	2546	2618	2690	2761	2833	2905	-702	-630	-558
IMPORT DUTY	--	--	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAX	--	--	561	142	142	142	142	253	672	672	672	672	677	699	720	742	764	785	807	828	850	872	0	0	0
NET INCOME A/TAX	--	--	1309	331	331	331	331	590	1568	1568	1568	1568	1580	1631	1681	1732	1782	1832	1883	1933	1983	2034	-702	-630	-558

(CASH FLOW TABLE)

SOURCE OF FUNDS																									
CASH INCOME	0	0	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	0	0	0
PAID-IN CAPITAL	2930	4803	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEBT (L-T LOAN)	25611	26730	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SOURCE	28541	31532	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	0	0	0
APPLICATION OF FUNDS																									
CAPITAL INVESTMENT	28541	31532	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PLANT INVESTMENT	28366	29832	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRE-OPERATION COST	0	785	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INITIAL W/C	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IDC	175	887	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEBT SERVICE PAYMENT	0	0	1439	1439	1439	1439	1439	1439	1439	1439	1439	1439	4038	3966	3894	3823	3751	3679	3607	3535	3463	3391	3319	3247	3175
REPAYMENT (L-T LOAN)	0	0	0	0	0	0	0	0	0	0	0	0	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617
INTEREST (L-T LOAN)	0	0	1439	1439	1439	1439	1439	1439	1439	1439	1439	1439	1421	1349	1277	1205	1134	1062	990	918	846	774	702	630	558
INCREASING W/C	0	0	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IMPORT DUTY	0	0	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAX	0	0	561	142	142	142	142	253	672	672	672	672	677	699	720	742	764	785	807	828	850	872	0	0	0
CASH INCREASE	-2930	-4803	2748	3071	3071	3071	3071	2960	3938	3938	3938	3938	1334	1384	1434	1485	1535	1585	1636	1686	1737	1787	-3319	-3247	-3175
TOTAL APPLICATION	28541	31532	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	6049	0	0	0
CUMULATIVE CASH INC.	-2930	-7733	-4985	-1914	1157	4228	7299	10259	14197	18135	22073	26011	27344	28728	30163	31647	33183	34768	36404	38090	39827	41614	38295	35048	31873
W/C RETURN & SALVAGE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12123	0	0	0
CASH FLOW (ROE A/TAX)	-2930	-4803	2748	3071	3071	3071	3071	2960	3938	3938	3938	3938	1334	1384	1434	1485	1535	1585	1636	1686	1737	13910	-3319	-3247	-3175
ROE A/TAX (%)	--	--	--	--	5.97	16.57	22.71	26.36	29.40	31.34	34.31	34.31	33.68	33.84	33.96	34.05	34.31	34.17	34.21	34.31	34.26	34.31	34.31	34.31	34.31
CASH FLOW (ROE B/TAX)	-2930	-4803	3309	4610	4610	4610	4610	4610	4610	4610	4610	4610	2011	2083	2155	2227	2299	2371	2443	2515	2587	14782	-3319	-3247	-3175
ROE B/TAX (%)	--	--	--	1.22	21.82	32.03	37.57	40.78	42.72	43.93	44.70	45.69	45.69	45.45	45.52	45.57	45.61	45.63	45.65	45.66	45.67	45.69	45.70	45.70	45.70

ROI A/TAX (%) : 5.11 ROI B/TAX (%) : 7.90 PAYBACK FOR ROI A/TAX (YRS) : 13.1
ROE A/TAX (%) : 34.32 ROE B/TAX (%) : 45.69 PAYBACK FOR ROE A/TAX (YRS) : 2.6

(PROFIT LOSS STATEMENT)

YEAR	2012	2013	2014	2015	2016	2017	2018	
PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
ANNUAL REVENUE	0	0	0	0	0	0	0	231283
OPERATING COST	0	0	0	0	0	0	0	110297
RAW MATERIAL	0	0	0	0	0	0	0	52493
VARIABLE OPE-COST	0	0	0	0	0	0	0	19144
FIXED OPE-COST	0	0	0	0	0	0	0	38660
CASH INCOME	0	0	0	0	0	0	0	120986
DPR./AMT.	0	0	0	0	0	0	0	49251
INTEREST	486	414	342	270	198	126	54	29147
LONG TERM LOAN	486	414	342	270	198	126	54	29147
NET INCOME B/TAX	-486	-414	-342	-270	-198	-126	-54	42588
IMPORT DUTY	0	0	0	0	0	0	0	6985
INCOME TAX	0	0	0	0	0	0	0	11814
NET INCOME A/TAX	-486	-414	-342	-270	-198	-126	-54	23788

(CASH FLOW TABLE)

SOURCE OF FUNDS								
CASH INCOME	0	0	0	0	0	0	0	120986
PAID-IN CAPITAL	0	0	0	0	0	0	0	7733
DEBT (L-T LOAN)	0	0	0	0	0	0	0	52341
TOTAL SOURCE	0	0	0	0	0	0	0	181060
APPLICATION OF FUNDS								
CAPITAL INVESTMENT	0	0	0	0	0	0	0	60074
PLANT INVESTMENT	0	0	0	0	0	0	0	58198
PRE-OPERATION COST	0	0	0	0	0	0	0	785
INITIAL W/C	0	0	0	0	0	0	0	29
IDC	0	0	0	0	0	0	0	1062
DEBT SERVICE PAYMENT	3103	3031	2959	2887	2815	2743	2671	81488
REPAYMENT (L-T LOAN)	2617	2617	2617	2617	2617	2617	2617	52341
INTEREST (L-T LOAN)	486	414	342	270	198	126	54	29147
INCREASING W/C	0	0	0	0	0	0	0	1301
IMPORT DUTY	0	0	0	0	0	0	0	6985
INCOME TAX	0	0	0	0	0	0	0	11814
CASH INCREASE	-3103	-3031	-2959	-2887	-2815	-2743	-2671	11665
TOTAL APPLICATION	0	0	0	0	0	0	0	181060
CUMULATIVE CASH INC.	28771	25740	22781	19894	17079	14336	11665	11665
W/C RETURN & SALVAGE	0	0	0	0	0	0	0	12123
CASH FLOW (ROE A/TAX)	-3103	-3031	-2959	-2887	-2815	-2743	-2671	23788
ROE A/TAX (%)	34.31	34.31	34.31	34.31	34.31	34.32	34.32	--
CASH FLOW (ROE B/TAX)	-3103	-3031	-2959	-2887	-2815	-2743	-2671	42588
ROE B/TAX (%)	45.69	45.69	45.69	45.69	45.69	45.69	45.69	--

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CURRENT ASSSET																									
CASH ON HAND	0	29	2868	5939	9010	12081	15151	18111	22049	25987	29925	33863	35197	36581	38015	39500	41035	42620	44256	45942	47679	61469	58150	54903	51728
ACCOUNT RECEIVABLE	0	0	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842	0	0	0	0
PRODUCT INVENTORY	0	0	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	654	0	0	0	0
OTHERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTL. CURRENT ASSET	0	29	4364	7435	10506	13577	16647	19607	23545	27483	31421	35359	36693	38077	39511	40996	42531	44116	45752	47438	49175	61469	58150	54903	51728
FIXED ASSET																									
*EQUIPMENT & MACHINERY	25436	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872	50872
CUM. DEPRECIATION	0	0	2238	4477	6715	8954	11192	13430	15669	17907	20146	22384	24622	26861	29099	31338	33576	35814	38053	40291	42530	50872	50872	50872	50872
BOOK VALUE	25436	50872	48634	46395	44157	41918	39680	37442	35203	32965	30726	28488	26250	24011	21773	19534	17296	15058	12819	10581	8342	0	0	0	0
*CIVIL & BUILDING	2930	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326	7326
CUM. DEPRECIATION	0	0	132	264	396	527	659	791	923	1055	1187	1319	1451	1582	1714	1846	1978	2110	2242	2374	2505	7326	7326	7326	7326
BOOK VALUE	2930	7326	7194	7062	6930	6799	6667	6535	6403	6271	6139	6007	5875	5744	5612	5480	5348	5216	5084	4952	4821	0	0	0	0
*INTANGIBLE ASSET	175	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847
CUM. AMORTIZATION	0	0	369	739	1108	1478	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847	1847
BOOK VALUE	175	1847	1478	1108	739	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTL. FIXED ASSET	28541	60045	57305	54566	51826	49086	46347	43976	41606	39236	36866	34495	32125	29755	27385	25014	22644	20274	17903	15533	13163	0	0	0	0
TTL. ASSET	28541	60074	61669	62001	62332	62663	62994	63583	65151	66719	68287	69854	68818	67832	66896	66010	65175	64390	63655	62971	62338	61469	58150	54903	51728
CURRENT LIABILITY																									
ACCOUNT PAYABLE	0	0	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	0	0	0	0
S-T LOAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTL. CURRENT LIABILITY	0	0	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	0	0	0	0
L-T LIABILITY																									
L-T LOAN	25611	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	49724	47107	44490	41873	39256	36639	34022	31405	28788	26171	23554	20937	18320
STOCKHOLDERS EQUITY																									
CAPITAL	2930	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733	7733
RETAINED EARNING	0	0	1309	1640	1971	2302	2633	3223	4791	6359	7927	9495	11075	12706	14387	16119	17901	19733	21616	23549	25532	27566	26864	26234	25676
TTL. EQUITY	2930	7733	9042	9373	9704	10035	10366	10956	12524	14092	15660	17228	18808	20439	22120	23852	25634	27466	29349	31282	33265	35299	34597	33967	33409
TTL. LIABILITY & EQUITY	28541	60074	61669	62000	62331	62662	62993	63583	65151	66719	68287	69855	68818	67832	66896	66011	65176	64391	63657	62973	62339	61470	58151	54904	51729

YEAR	2012	2013	2014	2015	2016	2017	2018
PROJECT YEAR	24	25	26	27	28	29	30
CURRENT ASSSET							
CASH ON HAND	48625	45594	42635	39748	36933	34190	31519
ACCOUNT RECEIVABLE	0	0	0	0	0	0	0
PRODUCT INVENTORY	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0
TTL. CURRENT ASSET	48625	45594	42635	39748	36933	34190	31519
FIXED ASSET							
*EQUIPMENT & MACHINERY	50872	50872	50872	50872	50872	50872	50872
CUM. DEPRECIATION	50872	50872	50872	50872	50872	50872	50872
BOOK VALUE	0	0	0	0	0	0	0
*CIVIL & BUILDING	7326	7326	7326	7326	7326	7326	7326
CUM. DEPRECIATION	7326	7326	7326	7326	7326	7326	7326
BOOK VALUE	0	0	0	0	0	0	0
*INTANGIBLE ASSET	1847	1847	1847	1847	1847	1847	1847
CUM. AMORTIZATION	1847	1847	1847	1847	1847	1847	1847
BOOK VALUE	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0
TTL. FIXED ASSET	0	0	0	0	0	0	0
TTL. ASSET	48625	45594	42635	39748	36933	34190	31519
CURRENT LIABILITY							
ACCOUNT PAYABLE	0	0	0	0	0	0	0
S-T LOAN	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0
TTL. CURRENT LIABILITY	0	0	0	0	0	0	0
L-T LIABILITY							
L-T LOAN	15703	13086	10469	7852	5234	2617	0
STOCKHOLDERS EQUITY							
CAPITAL	7733	7733	7733	7733	7733	7733	7733
RETAINED EARNING	25190	24776	24434	24164	23966	23840	23786
TTL. EQUITY	32923	32509	32167	31897	31699	31573	31519
TTL. LIABILITY & EQUITY	48626	45595	42636	39749	36933	34190	31519

*** CAPITAL INVESTMENT COST ***

PROJECT YEAR	-2		-1		TOTAL
TERM	1	2	1	2	--
CAPITAL INVESTMENT	14183	14358	15675	15858	6.0E+04
PLANT INVESTMENT	14183	14183	14916	14916	5.8E+04
EQUIP. & MACHINERY	12718	12718	12718	12718	5.1E+04
CIVIL & BUILDING	1465	1465	2198	2198	7326.00
PRE-OPERATION COST	0	0	393	393	785.00
INITIAL W/C	0	0	15	15	29.00
IDC	0	175	352	535	1061.68

*** INCREASING W/C ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
INCREASING W/C	--	--	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCREASING W/C	--	--	1301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
INCREASING W/C	0	0	0	0	0	0	0	1301.00
INCREASING W/C	0	0	0	0	0	0	0	1301.00

*** DEPRECIATION/AMORTIZATION ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
DPR./AMT.	--	--	2740	2740	2740	2740	2740	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	0	0	0
DEPRECIATION	--	--	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	0	0	0
EQUIP. & MACHINERY	--	--	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	0	0	0
CIVIL & BUILDING	--	--	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	0	0	0
AMORTIZATION	--	--	369	369	369	369	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRE-OPERATION COST	--	--	157	157	157	157	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IDC	--	--	212	212	212	212	212	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
DPR./AMT.	0	0	0	0	0	0	0	4.9E+04
DEPRECIATION	0	0	0	0	0	0	0	4.7E+04
EQUIP. & MACHINERY	0	0	0	0	0	0	0	4.5E+04
CIVIL & BUILDING	0	0	0	0	0	0	0	2637.36
AMORTIZATION	0	0	0	0	0	0	0	1846.68
PRE-OPERATION COST	0	0	0	0	0	0	0	785.00
IDC	0	0	0	0	0	0	0	1061.68

*** ANNUAL REVENUE ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
ANNUAL REVENUE	--	--	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	11564	0	0	0
LPG	--	--	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	8540	0	0	0
CAPA.(TON/YEAR)	--	--	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	61000	0	0	0
UNIT PRICE(US$/TON)	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	0.00	0.00	0.00
NAPHTA	--	--	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	0	0	0
CAPA.(TON/YEAR)	--	--	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	0	0	0
UNIT PRICE(US$/TON)	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	225.00	0.00	0.00	0.00
LEAN GAS	--	--	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	2304	0	0	0
CAPA.(MSCF/YEAR)	--	--	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	1.1E+07	0	0	0
UNIT PRICE(US$/MSCF)	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.00	0.00	0.00

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
ANNUAL REVENUE	0	0	0	0	0	0	0	2.3E+05
LPG	0	0	0	0	0	0	0	1.7E+05
CAPA.(TON/YEAR)	0	0	0	0	0	0	0	--
UNIT PRICE(US$/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
NAPHTA	0	0	0	0	0	0	0	1.4E+04
CAPA.(TON/YEAR)	0	0	0	0	0	0	0	--
UNIT PRICE(US$/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
LEAN GAS	0	0	0	0	0	0	0	4.6E+04
CAPA.(MSCF/YEAR)	0	0	0	0	0	0	0	--
UNIT PRICE(US$/MSCF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--

*** RAW MATERIAL COST ***

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
RAW MATERIAL COST	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	0	0	0
RICH GAS	--	--	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	2625	0	0	0
UNIT CONS.(MSCF/TON)	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	205.57	0.00	0.00	0.00
UNIT PRICE(US$/MSCF)	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.00	0.00	0.00

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
RAW MATERIAL COST	0	0	0	0	0	0	0	5.2E+04
RICH GAS	0	0	0	0	0	0	0	5.2E+04
UNIT CONS.(MSCF/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
UNIT PRICE(US$/MSCF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--

*** VARIABLE OPE-COST ***********************************

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ON-STREAM FACTOR (%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
VARIABLE OPE-COST	--	--	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	0	0	0
ELECTRICITY	--	--	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	0	0	0
UNIT CONS.(KWH/TON)	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	406.70	0.00	0.00	0.00
UNIT PRICE(US$/KWH)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
WATER	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNIT CONS.(NM3/TON)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00
UNIT PRICE(US$/NM3)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
CHEMICALS	--	--	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	0	0	0
UNIT CONS.(US$/TON)	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	0.00	0.00	0.00
RIVER TRANSPORTATION	--	--	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	0	0	0
UNIT CONS.(US$/TON)	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	0.00	0.00	0.00

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
ON-STREAM FACTOR (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
VARIABLE OPE-COST	0	0	0	0	0	0	0	1.9E+04
ELECTRICITY	0	0	0	0	0	0	0	6923.37
UNIT CONS.(KWH/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
UNIT PRICE(US$/KWH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
WATER	0	0	0	0	0	0	0	1.25
UNIT CONS.(NM3/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
UNIT PRICE(US$/NM3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
CHEMICALS	0	0	0	0	0	0	0	3519.70
UNIT CONS.(US$/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
RIVER TRANSPORTATION	0	0	0	0	0	0	0	8699.82
UNIT CONS.(US$/TON)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--

*** FIXED OPE-COST ***********************************

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
FIXED OPE-COST	--	--	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	1933	0	0	0
LABOR COST	--	--	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	0	0	0
MAINTENANCE	--	--	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	0	0	0
INSURANCE	--	--	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	0	0	0
PLANT OVERHEAD	--	--	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174	0	0	0

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
FIXED OPE-COST	0	0	0	0	0	0	0	3.9E+04
LABOR COST	0	0	0	0	0	0	0	6960.00
MAINTENANCE	0	0	0	0	0	0	0	2.5E+04
INSURANCE	0	0	0	0	0	0	0	3600.00
PLANT OVERHEAD	0	0	0	0	0	0	0	3480.00

*** INCOME TAX **********

PROJECT YEAR	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
NET INCOME B/TAX	--	--	1870	1870	1870	1870	1870	2240	2240	2240	2240	2240	2258	2330	2402	2474	2546	2618	2690	2761	2833	2905	-702	-630	-558
IMPORT DUTY	--	--	0	1397	1397	1397	1397	1397	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAXABLE INCOME	--	--	1870	473	473	473	473	843	2240	2240	2240	2240	2258	2330	2402	2474	2546	2618	2690	2761	2833	2905	-702	-630	-558
INCOME TAX RATE (%)	--	--	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	0	0	0
INCOME TAX	--	--	561	142	142	142	142	253	672	672	672	672	677	699	720	742	764	785	807	828	850	872	0	0	0
NET INCOME A/TAX	--	--	1309	331	331	331	331	590	1568	1568	1568	1568	1580	1631	1681	1732	1782	1832	1883	1933	1983	2034	-702	-630	-558

PROJECT YEAR	24	25	26	27	28	29	30	TOTAL
NET INCOME B/TAX	-486	-414	-342	-270	-198	-126	-54	4.3E+04
IMPORT DUTY	0	0	0	0	0	0	0	6985.00
TAXABLE INCOME	-486	-414	-342	-270	-198	-126	-54	3.6E+04
INCOME TAX RATE (%)	0	0	0	0	0	0	0	--
INCOME TAX	0	0	0	0	0	0	0	1.2E+04
NET INCOME A/TAX	-486	-414	-342	-270	-198	-126	-54	2.4E+04

*** DEBT SERVICE PAYMENT ( ) **********

PROJECT YEAR	-2		-1		1		2		3		4		5		6		7		8		9		10	
TERM	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
BORROWING	12718	12893	13274	13456	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING	12718	25611	38885	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341	52341
REPAYMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST	0	0	0	0	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720

PROJECT YEAR	11		12		13		14		15		16		17		18		19		20		21		22	
TERM	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
BORROWING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING	51032	49724	48415	47107	45798	44490	43181	41873	40564	39256	37947	36639	35330	34022	32713	31404	30096	28787	27479	26170	24862	23553	22245	20936
REPAYMENT	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309
INTEREST	720	702	684	666	648	630	612	594	576	558	540	522	504	486	468	450	432	414	396	378	360	342	324	306

PROJECT YEAR	23		24		25		26		27		28		29		30		TOTAL
TERM	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	--
BORROWING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.2E+04
REMAINING	19628	18319	17011	15702	14394	13085	11777	10468	9160	7851	6543	5234	3926	2617	1309	0	--
REPAYMENT	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	5.2E+04
INTEREST	288	270	252	234	216	198	180	162	144	126	108	90	72	54	36	18	2.9E+04

Chapter 12

ECONOMIC EVALUATION

Chapter 12. ECONOMIC EVALUATION

12.1 General

Mining sector in Burma (production of petroleum and gas, in particular) is an important sector of the Burmese economy in that it supplies necessary raw material and fuel to the process and manufacturing industries and also serves as one of the major foreign exchange earning sources of the country along with agricultural and forestry industries.

The project is an export-oriented energy project which extracts LPG from petroleum associated gas currently utilized as raw material or fuel, and its influence given to the Burmese economy by LPG export is considered to be great.

Of the Integrated LPG Project undertaken by Burma, Phase I – Part 1 and Part 2, and Phase II are now in the course of implementation and this Project has been planned as Phase III in the series of the Integrated LPG Project. The economic analysis is to evaluate the economic effects that can be derived from the implementation of the Phase III of the LPG Project.

12.2 Economic Benefits expected by the Project

In the economic analysis, the economic benefits that can be expected by implementing the Project are evaluated in terms of the direct benefits and the indirect benefits.

12.2.1 Direct Benefits

Economic values of LPG produced and of by-product naphtha can be cited as the major sources for the direct benefits of the Project.

LPG produced by the Project is to be exported in its entirety to the neighboring countries to serve as an important source of foreign exchange earnings. The whole quantity of by-product naphtha is also to be exported. Furthermore, LPG produced in this way will be able to fill the needs of domestic consumption when the domestic demand for LPG is increased in the future.

The economic analysis has evaluated the various economic effects as described in detail in the Section 12.3, on the assumption that the foreign exchange revenues from the exports of LPG and naphtha, and the sales revenues of lean gas sold at the economic price as defined in Item 12.3.2 constitute the direct economic benefits of the Project.

12.2.2 Indirect Benefits

The following effects are considered as the major indirect benefits:

1) Increased opportunity for employment
2) Stimulation of regional economy
3) Effect of improvement in the living standards
4) Effect of the technology transfer
5) Other benefits as may be anticipated by executing the Integrated LPG Project

Each of the said indirect benefits is described in detail in Section 12.5.

12.3 Economic Internal Rate of Return (EIRR)

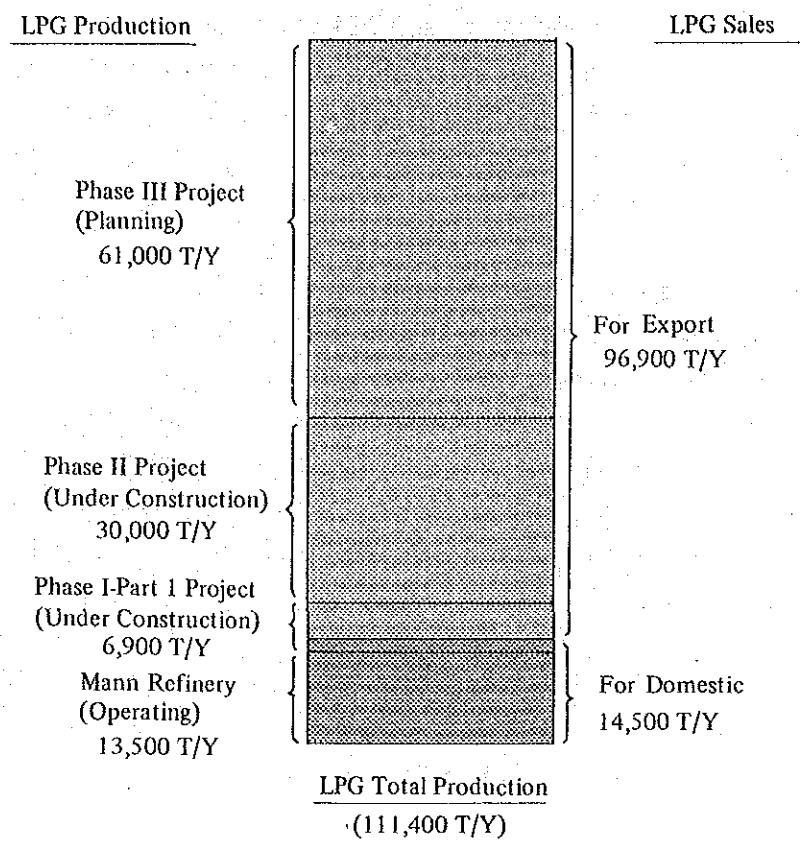
The Economic Internal Rate of Return (EIRR) is determined for the Project through the calculations on the various economic benefits and costs anticipated from the implementation of the Project.

12.3.4 Demand and Supply Forecast of LPG and By-product Naphtha

In order to grasp the economic effects of the Project correctly, the demand and supply situation for LPG and naphtha in Burma for 1989 and onward needs to be reviewed assuming two cases, namely, one is the case the Project is not realized, and the other is the case if the Project is implemented as contemplated.

LPG production and sales plan in Burma is shown in Fig. 12-1, with production shares of the LPG recovery at the existing Mann Oil Refinery and the LPG production contemplated under the Integrated LPG Project constituting of the Phases I, II and III.

Fig. 12-1 LPG Production and Sales Plan



As shown in Fig. 12-1, domestic consumption of LPG in Burma still remains at a low level, and LPG produced in Phase III Project is to be exported in its entirety. This means that if the Phase III Project is not implemented, the volumeof Burma's LPG export will decrease by the quantity expected to be produced in the Project.

The entire volume of naphtha produced as the by-product in the Project is also expected to be exported. Since Burma is not importing either naphtha or gasoline at present, its export volume of naphtha is considered to decrease by the quantity of naphtha produced by the Project, should the Project not be materialized.

12.3.2 Direct Benefits

As described in the preceding section, the direct benefits of the Project are the foreign exchange earnings that come from the exports of the LPG product and naphtha, and also the sales revenues of the lean gas.

As described in Chapter 11, the export prices for LPG and naphtha at the time of starting the plant operation have been fixed at US$140/ton and US$225/ton, respectively. These export prices have been decided based on the prices for these items currently in force in the world markets. Accordingly, in the economic analysis, the export prices used in the financial analysis for LPG and naphtha are regarded as their economic prices, and are used for computing economic return of the Project.

The lean gas will have a reduced heat value. It has been notified that the lean gas will be delivered at the same unit price per volume as that for the rich gas currently used as the feed stock. When the Project is implemented, some kind of countermeasures should be taken to compensate the reduced calorific value of lean gas for the present users (like Kyangin Cement Mill and Myanaung Power Station, etc.), for example, to increase the lean gas consumption rate in compensation for the reduced calorific value. Accordingly, in the economic analysis, it is so assumed that the economic price for the lean gas is to be lowered by the amount equivalent to the said reduction in the heat value, from the sales price employed in the financial analysis.

In evaluating the economic benefits and costs, the U.S. Dollar is valued at the actual foreign exchange rate in market transactions, as in the case with the financial analysis, without applying the shadow rates for foreign exchanges.

The direct benefits calculated in this manner are summarized as shown in Table 12-1.

Table 12-1 Economic Benefit

Item	Unit Price	Annual Amount (US$1,000)
LPG	US$140/T	8,540
Naphtha	US$225/T	720
Lean Gas	US$0.183/$10^3$ SCF	2,010
Total	–	11,270

12.3.3 Economic Costs

(1) Initial investment cost for the implementation of the Project

The initial investment cost for implementing the Project includes plant construction cost, commissioning fee, pre-operation cost and initial working capital. The amount of the investment cost equals to the sum of the total capital requirement used for calculating the IRROI in the financial analysis as shown in Table 12-2.

(2) Cost of raw material consumed

Raw material used in the operation of the Project is the associated gas supplied from MOC. The associated gas has already been in use as fuel at the cement mill and the power station in the proximity of the proposed plant site.

The economic cost of the raw material in the Project is set at the same price as the feed gas price employed in the financial analysis.

(3) Labor cost

In view of the nature of the Project, quality of the labor resources to be hired for the plant will be at fairly high level on the standard level of labor currently in force in the country, and the labor cost higher than normal is used in the financial analysis. Therefore, evaluation here for economic analysis is made on the same labor costs as those used for the financial analysis.

(4) Other costs for production

In addition to those mentioned above, such other costs required for production should be considered. These are costs for utilities, chemicals, inland transportation of products, and the maintenance cost for the equipment and machinery. The land for the proposed plant site is owned by state and therefore will be made available to the Project without charge. As there is no plan to utilize the land for any purposes, other than that for the Project, the economic cost for the land is assumed to be zero.

Taxes (import duty and CTS) levied according to the Burmese law and insurance premium on the fixed asset are not accounted for as the cost in the economic analysis as they are regarded as the transferred item within the country.

On the basis of the analysis as detailed above, the economic costs of the Project are summarized as shown in Table 12-2 below.

Table 12-2 Economic Cost

(US$1,000)

Item \ Year		Capital Cost		Annual Opearting Cost
		-2	-1	1 – 20
Capital Cost	Plant Construction Cost	28,366	29,831	–
	Commissioning Fee	–	407	–
	Pre-operation Cost	–	378	–
	Initial Working Capital	–	29	–
Operating Cost	Variable Operating Cost (Raw Material: Rich Gas)	–		3,582 (2,625)
	Fixed Operating Cost	–		1,753
Total		59,011		5,335

12.3.4 Calculation of Economic Internal Rate of Return (EIRR)

The Economic Internal Rate of Return (EIRR) of the Project with the project life of 20 years, and on the basis of economic benefits and costs mentioned above are summarized in Table 12-3 below.

Table 12-3 Economic Internal Rate of Return

(US$1,000)

Year	Economic cost			Economic Benefit	Economic Cash Flow
	Capital Cost	Operating Cost	Total		
-2 ('87)	28,366	–	28,366	–	-28,366
-1 ('88)	30,645	–	30,645	–	-30,645
1 ('89)	1,301	5,335	6,636	11,270	4,634
2 – 19	–	5,335	5,335	11,270	5,935
20 (2008)	-1,330	5,335	4,005	11,270	7,265
Total	58,982	106,700	165,682	225,400	59,718
				EIRR	7.20%

As shown in the above Table, the EIRR is 7.20% which is better than 5.11% of the IRROI after tax/CTS but is slightly lower than 7.90% of the IRROI before tax/CTS in the financial analysis. The implementation of the Project will contribute immensely to the Burmese economy, by earning foreign exchange amounting to US$90,532,000 as direct economic benefits over the entire project life. Furthermore, a number of indirect economic benefits are also conceived. As results of the above benefits, the Project will make a high overall economic effect, and therefore an undertaking of the Project is suggested itself to proceed positively.

12.4 Effect of the Phase III Project on Burma's Foreign Exchange Balance

Influence of the Project on Burma's foreign exchange balance is considered in this section.

12.4.1 Provisions and Methodology of Analysis

(1) Total capital requirement

The total capital requirement described before in the financial analysis is procured and introduced in accordance with the financing schedule as shown in Table 12-4 below.

Table 12-4 Financing Schedule

(US$1,000)

Year	-1 (1987/88)	-2 (1988/89)	Total
Self Financing	2,930	4,802	7,732
Long-Term Loan	25,611	26,730	52,341
Total	28,541	31,532	60,073

(2) Foreign exchange outflow

Expenses to be paid in foreign exchange after starting up the plant operation include the following:

- o Repayment of principal and interest of long-term loan
- o Maintenance cost (Cost of imported spair parts, etc.)

(3) Foreign exchange inflow

Foreign exchange inflow expected of the implementation of the Project is brought about by sales revenues according from export of LPG and by-product naphtha.

The difference between the above-mentioned foreign exchange inflow and outflow is regarded as the net foreign exchange earnings or loss realized from the Project.

12.4.2 Balance of Foreign Exchange

The balance of foreign exchange of the Project is calcualted on the above-mentioned conditions and is shown in Table 12-5.

Table 12-5 Net Foreign Exchange Earnings

(US$1,000)

Year	Foreign Exchange Inflow			Foreign Exchange Outflow				Net Foreign Exchange Flow (1) – (2)
	LPG Export	Naphtha Export	Sub-Total (1)	Main-tenance Cost	Interest on Long-Term Loan	Repay-ment of Long-Term Loan	Sub-Total (2)	
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
1	8,540	720	9,260	659	1,439	0	2,098	7,162
2	8,540	720	9,260	659	1,439	0	2,098	7,162
3	8,540	720	9,260	659	1,439	0	2,098	7,162
4	8,540	720	9,260	659	1,439	0	2,098	7,162
5	8,540	720	9,260	659	1,439	0	2,098	7,162
6	8,540	720	9,260	659	1,439	0	2,098	7,162
7	8,540	720	9,260	659	1,439	0	2,098	7,162
8	8,540	720	9,260	659	1,439	0	2,098	7,162
9	8,540	720	9,260	659	1,439	0	2,098	7,162
10	8,540	720	9,260	659	1,439	0	2,098	7,162
11	8,540	720	9,260	659	1,421	2,617	4,697	4,563
12	8,540	720	9,260	659	1,349	2,617	4,625	4,635
13	8,540	720	9,260	659	1,277	2,617	4,553	4,707
14	8,540	720	9,260	659	1,205	2,617	4,481	4,779
15	8,540	720	9,260	659	1,134	2,617	4,410	4,850
16	8,540	720	9,260	659	1,062	2,617	4,338	4,922
17	8,540	720	9,260	659	990	2,617	4,266	4,994
18	8,540	720	9,260	659	918	2,617	4,194	5,066
19	8,540	720	9,260	659	846	2,617	4,122	5,138
20	8,540	720	9,260	659	774	2,617	4,050	5,210
21	0	0	0	0	702	2,617	3,319	-3,319
22	0	0	0	0	630	2,617	3,247	-3,247
23	0	0	0	0	558	2,617	3,175	-3,175
24	0	0	0	0	486	2,617	3,103	-3,103
25	0	0	0	0	414	2,617	3,031	-3,031
26	0	0	0	0	342	2,617	2,959	-2,959
27	0	0	0	0	270	2,617	2,887	-2,887
28	0	0	0	0	198	2,617	2,815	-2,815
29	0	0	0	0	126	2,617	2,743	-2,743
30	0	0	0	0	54	2,617	2,671	-2,671
Total	170,800	144,000	185,200	13,180	29,147	52,341	94,668	90,532

According to the estimated balance of foreign exchange, it is anticipated that the Project will have, during its project life, foreign exchange inflow amounting to US$185,200,000 and outflow of US$94,668,000 respectively. This means that net foreign exchange earnings, amounting to US$90,532,000 can be gained, and which clearly indicates the decisive role played by the Project for the improvement and progress of Burmese economy.

12.5 Indirect Benefits of the Phase III Project

12.5.1 Increase of Employment

Many workers of different crafts will be hired locally for the construction work of this LPG Plant. After starting its commercial operation, approximately 450 employees and altogether about 1,800 persons including their family members, will have a stable source of income.

There are no industrial factories in the Kyangin area, except the cement mill now in operation, therefore, the addition of new chance of employment realized by the Project offers one of the important industrial benefits expected of the Project.

12.5.2 Stimulation of Regional Economy

By implementing the Project, physical distribution of the materials and equipment in the region, products and necessity daily items will be invigorated throughout the construction and the subsequent operation periods.

In the Project, residential facilities for employees and their families are to be newly developed as the construction of the plant progress, with a substantial reinforcement of the infrastructure in the Kyangin area. In addition to these, presence of the plant itself will serve to activate various kinds of commercial activities in the region contributing to the development of the district as a whole.

12.5.3 Improvement of National Living Standards

The Project is, in substance, a product export-oriented type of project, aiming at no direct sales of its products in the domestic market. Through the implementation of the Project, however, it will probably indirectly ensure the supply of LPG produced at other facilities to the domestic market. For this reason, an indirect ripple effect to improve the national living standards can be expected from the Project by converting to LPG consumption from the present

fuel consumption patterns of firing wood, charcoal, and other fuel sources by general households, which also has the added merit to preserve precious forest resources or to use it for other effective industrial applications.

12.5.4 Effect of Technology Transfer

As described in Chapter 4, LPG use in Burma is currently limited to the sheet glass factory and few other industrial factories.

A major factor suppressing the domestic demand for LPG in Burma is, on top of the still high price of LPG, the difficulty to handle LPG. That is; LPG being a gas that is liquefied under pressure classified as hazardous substance, its handling requires a relatively high level of technology, and appropriate regulation and law, which are now incomplete in Burma.

In view of this situation, the realization of the Project will benefit industrial sector of Burma conspicuously by way of upgrading technical capability, which will stimulate development of domestic demands for LPG, especifically through:

1) Acquisition of high-pressure LPG producing technology
2) Acquisition of high-pressure LPG handling technology

12.5.5 Other Benefits Obtained by Executing the Integrated LPG Project

The Project is proposed as the Phase III of the Integrated LPG Project in Burma. In anticipation of the materialization of the Project, the Syriam Terminal has been designed with redundant reserve in the capacity in the Phase II Project, therefore, construction of additional jettys will not be necessary for the Phase III Project.

In addition, because of the similarity in the nature of these two projects, most of the construction machinery and equipmet arranged for the construction work in the Phase II Project can be utilized for execution of that in the Phase III Project, thus reducing the total construction cost substantially. In this way, by implementing this Phase III Project as an integral portion of the Integrated LPG Project, the Project can make the best use of the investments made in the past.

Chapter 13

RECOMMENDATION

Chapter 13. RECOMMENDATION

The Survey Team offers the following recommendations for having this project completed in the scheduled time, for putting the facilities in operation smoothly as well as for stable supply of product and by-products to obtain as much profit as scheduled.

13.1 Construction Plan

1) To prevent any delay in construction schedules, the following condition must be observed most strictly:

   a) Detailed survey of conditions of plant site, terminal site, riverbed in jetty site, pipe line route and power transmission line route must be completed prior to the bidding of this project.

   b) Filling and reclaiming work in terminal site is to be performed by Burmese side. Because the work is expected to be difficult, it must be started beforehand and completed prior to the conclusion of contract of this project.

   c) Though it is planned to use large numbers of construction machinery owned by PIC; the actual condition of sections which need repair must be correctly estimated; the supply of spare parts must be considered previously to permit immediate procurement after the signing of this project; the machinery has to be maintained completely.

   d) The earliest procurement of 2 craft and FRP-boat, which are planned to be built for the project, must be considered previously to permit their effective use in the work of construction.
   The specialized ships must be secured for transporting required machinery, equipment and materials for plant construction over Irrawaddy River.

2) To decrease the construction cost, the following subjects are desirable to be discussed at the stage of detail planning:

   a) Reconsideration of distance between spherical tanks. According to the

regulations for the control of high pressure gas in Japan, in case there's no security facilities, the distance between spherical LPG tanks is designated as more than one quarter of the total diameters of tanks which adjoin each other. The plot plan which based on this is shown in Fig. 13-1 and Fig. 13-2. A large reduction of site area will be expected. If Kyangin Terminal is taken for example, soil material for reclamation work will be decreased 30%, that is from about 88,000 M^3 (filling height 4 m).

b) In the construction at Syriam Terminal in Phase I, for smooth performing of the construction, nozzling and valving at proper site have to be considered at the time of LPG piping, utility piping, to permit their easy connection.

3) It is necessary to perform this project according to the construction schedules because the increase in construction cost caused by delay in the proposed construction site will greatly impair the profitability.

4) To avoid any changes in construction schedules and costs, the required machinery, equipment and materials for this project to be procured by the Burmese side must be secured as scheduled so as not to obstruct the construction schedules.

13.2 Management Control

1) Regarding management control of terminals, allocation of the ocean tankers for export, control of river barges for LPG transportation between each LPG terminals, and control of LPG stock must be performed with complete adjustment. It is necessary to acquire management skill. Consideration must be given to management control since there is a limit to jetties for LPG in Syriam Terminal.

2) A number of skilled technicians for handling LPG must be trained completely in order to prevent any disaster arising from improper handling of the pressurized gas. And Burmese laws and regulations as well as the handling manual must be adjusted beforehand.

13.3 Marketing for Export and Domestic Demand

1) For the profitability of this project it is especially important to sell produced LPG stably at high price. The recommendation described in the Section 4.3 must be performed.

2) Domestic demand increases gradually. Therefore after the completion of Mann Terminal and Syriam Terminal in Phase I, LPG produced at Mann/Syriam Refinery will be applied for export except LPG for domestic deamnd. The adjustment is necessary in this case because it is possible that the exporting amount comes up to more than the basic planned amount in Phase III. Because LPG produced at Mann Refinery contains olefin components, consideration must be given to management such as separation in tanks, river barges, adjustment of export price.

However to ensure a successful result for the Integrated LPG Project (Phase III), efforts must be made for making maximum use of installed facilities and expansion of export.

As for the development of domestic market, the recommendation described in the Section 4.5 must be performed.

Fig. 13-1 Alternated Plot Plan for Kyangin Terminal Site

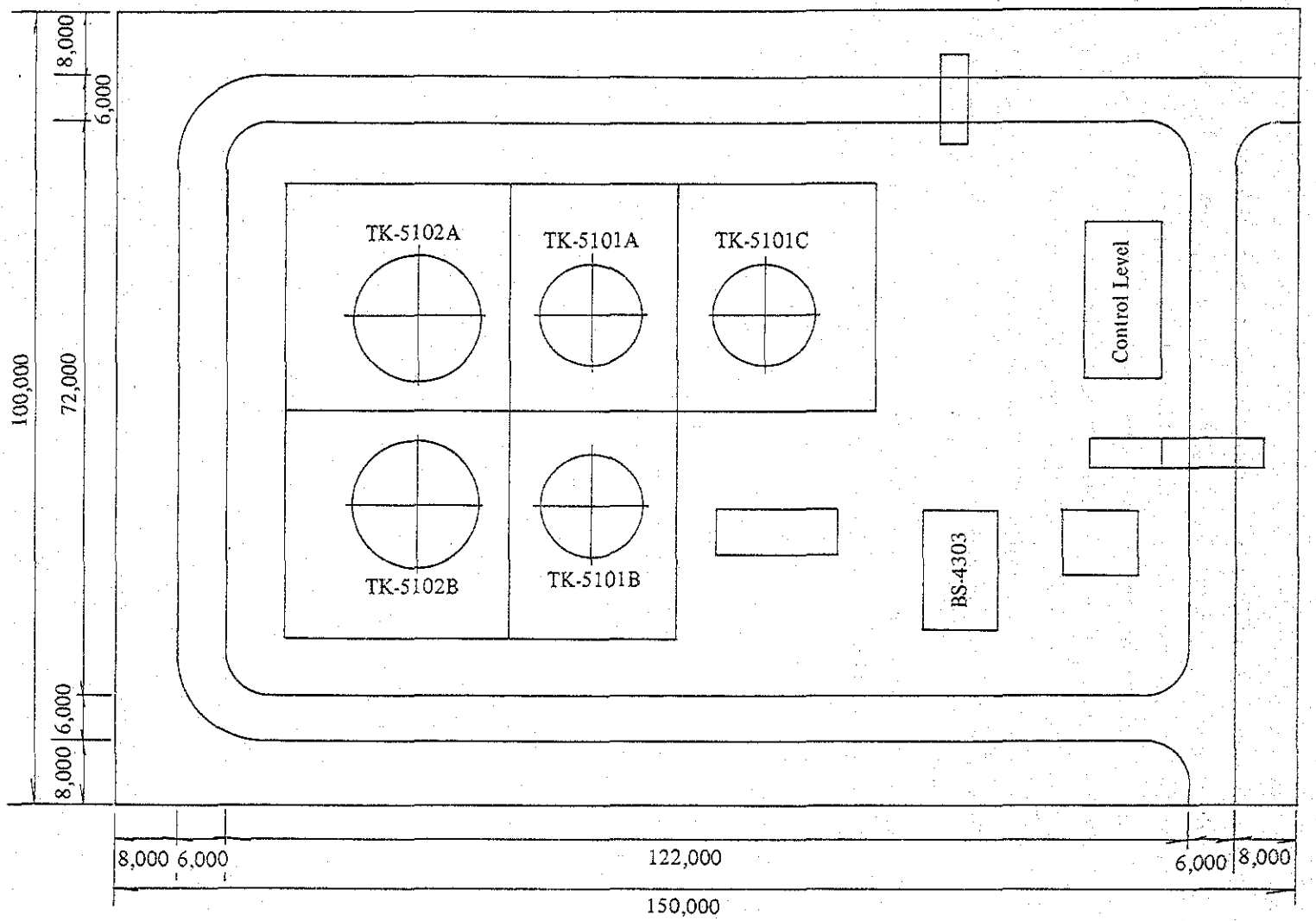
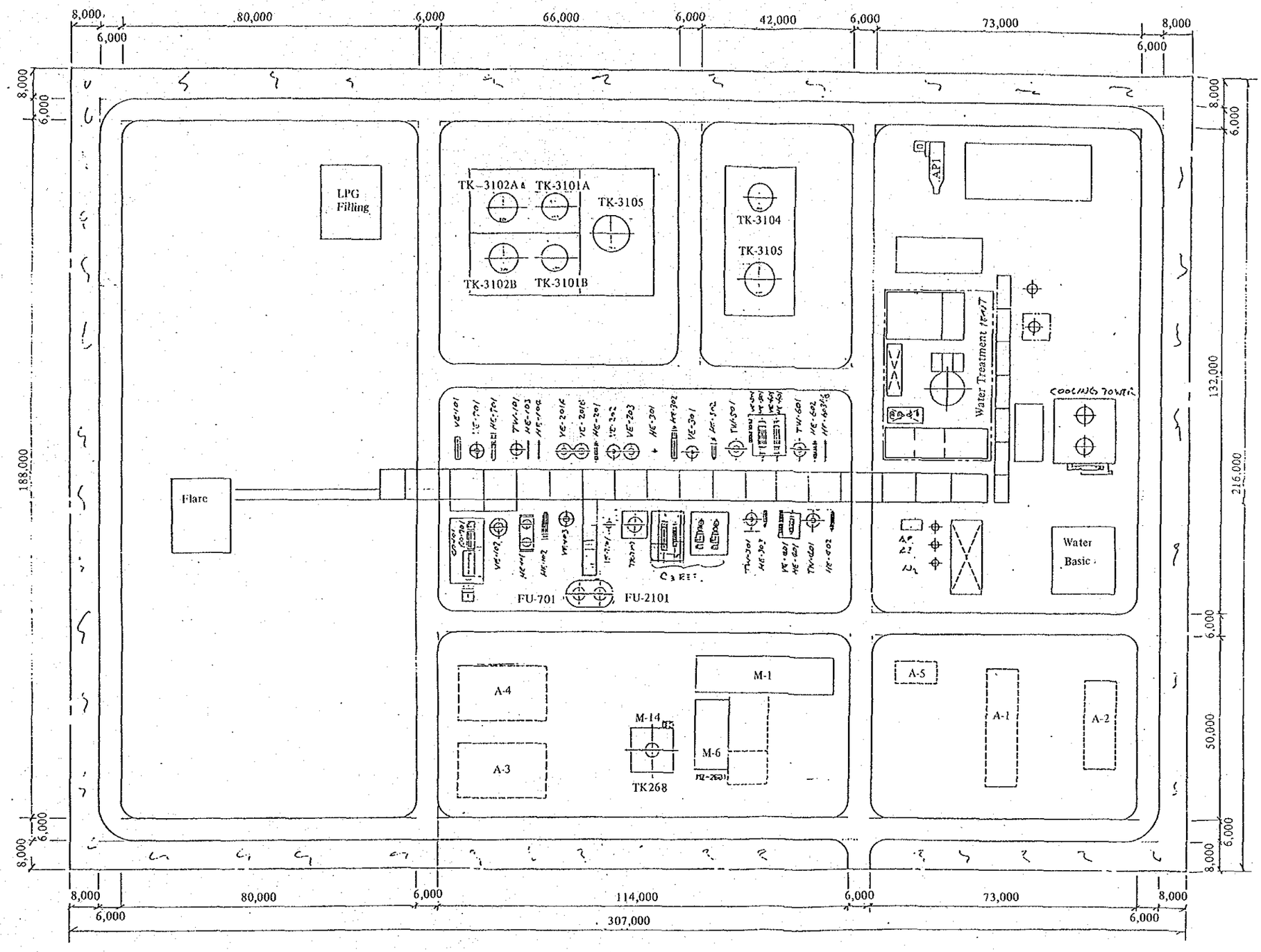


Fig. 13-2 Alternated Plot Plan for Kyangin Plant Site



APPENDIX – I

PROGRESS REPORT

THE SUMMARY OF DISCUSSION

BETWEEN

THE JAPANESE FEASIBILITY STUDY TEAM AND

THE PETROCHEMICAL INDUSTRIES CORPORATION

ON THE INTEGRATED LIQUEFIED PETROLEUM GAS PROJECT

(PHASE III)

The Japan Study Team (hereinafter referred to as "the Team") led by TETSUHIKO TSUNODA organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") visited the Socialist Republic of the Union of Burma from 27th: April to 16th: May 1985 in order to work out the Feasibility Study for the Integrated Liquefied Petroleum Gas Project (Phase III) (hereinafter referred to as "the Project") based on the Scope of Work for the Feasibility Study of the Project which was signed on 9th: April 1985 in Rangoon by Burmese side and on 22nd: April 1985 in Tokyo by Japanese side.

During its stay in the Socialist Republic of the Union of Burma, the Team exchanged views, conducted site surveys and also had a series of discussions with the Burmese authorities concerned for the feasibility study for the Project.

As a result of the site surveys and discussions the Team prepared the Progress Report and submitted 10 copies of it to Petrochemical Industries Corporation (hereinafter referred to as "PIC").

PIC; expressed sincere apprecations for the effort of the Team and satisfaction for the content of the Progress Report.

The Team promised to make their best efforts to prepare the Final Report after their return to Japan and expressed that the draft final report will be submitted by the middle of August 1985 to Burmese side.

The Team would like to put on record their sincere appreciation for the warm hearted welcome and cooperation extended to them by the Burmese side during their stay in Burma, and were able to collect enough data to enable them to carry out the study on an effective and efficient manner.

Rangoon, Dated: 15th: May, 1985.

(U Tin Maung Aye)
Managing Director
Petrochemical Industries
Corporation.

(T. Tsunoda)
Team Leader
The Feasibility Study Team
Japan International Cooperation
Agency (JICA).

PROGRESS REPORT

OF

FEASIBILITY STUDY TEAM

FOR

THE INTEGRATED LIQUEFIED PETROLEUM GAS PROJECT (PHASE III)

MAY 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

(JICA)

Progress Report

1. BACKGROUND

In accordance with the "Summary of Discussion between the Japanese Preliminary Survey Team and the Petrochemical Industries Corporation on the Scope of Work for the Feasibility Study on the Integrated Liquefied Petroleum Gas Project (Phase III)", August 1st., 1984, the Japan International Cooperation Agency (JICA) sent a seven member survey team (team) led by Mr. Tetsuhiko Tsunoda to Burma to study the feasibility of the Proposed Integrated LPG Project (Phase III) (this Project) from 27th: April to 16th: May, 1985.

2. THE PURPOSE OF TEAM

The purposes of the team's activity in Burma are to collect supplementary information and data in order to examine the feasibility of this Project from economic and technical points of view.

3. PROGRESS REPORT

Although the conclusion of the study can only be brought through study in Japan, the team would like to state the tentative views on some points of this Project.

It should be clearly noted that the team's views mentioned here might be changeable in the course of further study.

3.1 The proposed Sites of this Project

The following proposed sites may be suitable for this Project.

(a) Kyangin North (near Kyangin Cement Mill) for new LPG Plant.

(b) Kyangin South (near Malakagon) for new LPG loading terminal.

(c) Existing Syriam LPG Terminal for expansion of LPG Storage Tanks.

3.2 Loading and Unloading Jetties

Jetties of each site may be considered as follows:

(a) A new jetty may be provided at Malakagon for loading of products of the new LPG Plant.

(b) The LPG Jetty at Syriam may afford to unload LPG from the new plant together with LPG from the other plants to load for export.

3.3 Electric Power Supply System

New power transmission line from Myanaung Power Station to new LPG Recovery Plant shall be constructed. The following conditions may be suitable for this project.

(a)	Capacity	7000KVA
(b)	Voltage	66KV
(c)	Frequency	50HZ

4. SUBJECTS OF STUDY

(a) Associated Gas reserves, production capability and properties of the proposed Gas & Oil Fields

(b) Plans of terminals and LPG Recovery Plant

(c) Marketing of LPG

(d) Plan of River Barges

(e) Economic evaluation

(f) Construction

(g) Plan of Electric Power Supply System

(h) Others

5. ACTIVITIES OF THE TEAM IN BURMA

The team collected information and data on various aspects of this Project regarding the above mentioned subjects of study through discussion with the Burmese officials and investigation in site.

Details of activities of the team in Burma are shown in Annexure 2, "Notes of Discussion and Visit".

6. The following items will be studied by the team after its return to Japan.

A. Associated Gas reserves and production capability of the proposed Gas & Oil Fields.

(1) Evaluation of Associated Gas reserves and production capability for this Project.

3.4 The Existing Piping Lines

The following existing piping lines may be available for this Project.

Line Size (inch)	Existing			Use for this Project	Note
	Use	Direction			
		From	To		
10	Feed Gas	SHWEPYITHA Gas Field	EPC Control Station	None	
8	Feed Gas	EPC Control	HTANTABIN Control Station	Part of Lean Gas line to MYANAUNG Gas Turbine	
8	Feed Gas	EPC Control	MYANAUNG Gas Turbine	Part of Lean Gas line to MYANAUNG Gas Turbine	
10	Feed Gas	HTANTABIN Oil Field	HTANTABIN Control Station	Part of Feed Gas line to LPG Plant	
10	Feed Gas	HTANTABIN Control Station	KYANGIN Cement Mill	Part of Lean Gas line to KYANGIN Cement Mill	
10	Feed Gas	HTANTABIN Control Station	SEIKTHA Methanol Plant	Part of Lean Gas line to SEIKTHA Methanol Plant	Under Plann-ing

3.5 Basic conditions related to Feasibility Study are agreed with PIC and Study Team in "Annexure 1".

B. Plan of LPG Recovery Plant, Terminals and Jetty.

(1) Making conceptual design:

(a) Capacity

(b) Site

(c) Layout

(d) Facilities

(e) Processing

(2) Investigation as to the following items:

(a) Utilities plan

(b) Pipe lines

(c) Management for LPG Recovery Plant and Terminals

C. Marketing of LPG

(1) Analysis of LPG demand in Burma.

(2) LPG demand forecast in Burma by using Burmese informations.

(3) International LPG demand forecast by worldwide information about LPG.

(4) Estimation of LPG export price at Rangoon port.

(5) Recommendations to increment of LPG demand.

D. Plan of LPG Barges

(1) Evaluation of the actual transport condition in Irrawaddy River, and of the usability of existing pusher tug boats.

(2) Provision of conceptual design of Special River Barges for LPG transportation between new LPG Terminal and Syriam Terminal.

(a) Type (Self propelling)
(b) Capacity payload - 600 Ton or more
(c) Classification - NK
(d) The number required - Three
(e) Management

E. Economic Evaluation

Economic and financial evaluation will be done in the following manners, and some alternative evaluation, if necessary, will be also done.

(1) Financial analysis

Project revenue and cost incurred from this Project will be used for the financial calculation.

(2) Economic analysis

The analysis will be made from the viewpoint of contribution of this Project to Burmese economy.

F. Investment cost and implementation schedule

(1) The investment cost shall be estimated in foreign currency portion and the local currency portion, respectively.

(2) Preparation of the detailed implementation schedule of this Project.

G. Plants of Electric Power Supply System

(1) Making conceptual design of transmission line from Myanaung Power Station to Plant Site.

(a) Route

(b) Length

Annexure 1

BASIC CONDITIONS RELATED TO THE FEASIBILITY STUDY

Basic Condition Related to the Feasibility Study

No.	Items	Basic Conditions
1.	Sites	(1) KYANGIN North (near KYANGIN Cement Mill) for new LPG Plant (2) KYANGIN South (near MALAKAGON) for NEW LPG loading Terminal (3) The existing Syriam LPG Terminal for Expansion of LPG Storage Tanks.
2.	Jetties	(1) Loading jetty of New LPG Terminal will be provided at Malakagon. (2) The LPG Jetty at Syriam Terminal will be both used as loading & unloading.
3.	Electric Power Supply System	(1) Capacity 7000KVA (2) Voltage 66KV (3) Frequency 50HZ
4.	Existing Piping lines	(1) Five of six existing piping lines stated in para 3.4 of this PROGRESS REPORT will be available for this PROJECT.
5.	Production Rate	LPG from New LPG Recovery Plant .... 61,000 MT/Year
6.	Expected amount of LPG for Export	(1) LPG from NEW Recovery Plant .... 61,000 MT/Year (2) LPG from Mann Extraction Plant .... 30,000 MT/Year (3) LPG from Syriam Refinery .... 5,900 MT/Year Total 96,900 MT/Year
7.	Products Prices	(1) Export LPG - 140 $/t (2) Associated Gas from Gas Fields to New LPG Recovery Plant - 1.80K/1,000 SCF (3) Lean Gas from New LPG Recovery Plant to Existing Plants - 1.80K/1,000 SCF (4) Motor Spirit from New LPG Recovery Plant to domestic Use - 3.50K/Gal (IP) (5) Motor Spirit from New LPG Recovery Plant for export - 225 $/T

No.	Items	Basic Conditions
8.	Study Premises on Financial and Economic Analysis	(1) Exchange Rate: 1 US Dollar=8.60 Kyat 100 Japanese Yen = 3.50 Kyat (2) Project Life : 20 Years (3) Income Taxes : 30% on Net Annual Income (4) Debt/Equity Ratio: Foreign Exchange/ Local Currency (5) Loan Condition: Interest-2.75% p.a., Repayment-40 instalment, Grace - 10 Years

Annexure 2

NOTES OF DISCUSSION AND VISIT

NOTES OF DISCUSSION AND VISIT

1st:	Apr. 26 Fri.	: Leave Tokyo at 17:20 pm by TG 741
		: Arrive at Bangkok at 21:30 pm
2nd:	Apr. 27 Sat.	: Leave Bangkok at 14:50 pm by TG 305
		: Arrive at Rangoon at 15:30
3rd:	Apr. 28 Sun.	: Discussion within the Team
4th:	Apr. 29 Mon.	: (PM) Meeting at PIC
5th:	Apr. 30 Tue.	: (AM) Visit the Japanese Embassy and Japan International Cooperation Agency.
		: (PM) Discussion at PIC
6th:	May 1 Wed.	: Discussion within the Team
7th:	May 2 Thu.	: (AM) Discussion at MOC
		: (PM) Joint Discussion with TSC/PIC
8th:	May 3 Fri.	: (AM) Discussion at PIC
		: (PM) Joint Discussion with PIC/EPC
9th:	May 4 Sat.	: (AM) Visit Syriam Refinery, Syriam LPG Terminal and Jetties
10th:	May 5 Sun.	: Go to Seiktha from Rangoon
11th:	May 6 Mon.	: Survey Kyangin the North Site and the South Site.
		: Survey Kyangin LPG Jetty site
12th:	May 7 Tue.	: Survey Myanaung Power Station
		: Survey Myanaung Gas Field
		: Survey Myanaung Gas Control Station
		: Survey Transmission-line route from Myanaung Power Station to Plant site.

13th: May 8 Wed. : Survey Kyangin Cement Mill
: Survey Kyangin Cement Jetty
: Survey Seiktha Methanol Plant
: Survey Seiktha Methanol Jetty

14th: May 9 Thu. : Survey Shwepyitha Oil Field
: Survey Htantabin Oil Field
: Survey Methanol Temporary Jetty

15th: May 10 Fri. : Return to Rangoon from Seiktha

16th: May 11 Sat. : (AM) Discussion within the Team
: (PM) Discussion of questionnaire content at PIC

17th: May 12 Sun. : Discussion within the Team

18th: May 13 Mon. : (AM) Joint Discussion with PIC/TSC/EPC
: (PM) Joint Discussion with PIC/TSC/EPC

19th: May 14 Tue. : Joint Discussion with PIC/TSC/EPC

20th: May 15 Wed. : (AM) SUBMIT THE PROGRESS REPORT to the Burmese Side.
: (PM) RECEIVE BURMESE REPLY for the questionnaire prepared by the Team
: Joint final Discussion with PIC/TSC/EPC

21st: May 16 Thu. : (AM) Visit the Japanese Embassy and Japan International Cooperation Agency
: Leave Rangoon at 16:30 pm by TG 306
: Arrive at Bangkok at 18:10 pm

22nd: May 17 Fri. : Leave Bangkok at 10:30 am by TG 740
: Arrive at Tokyo at 18:25 pm

Answers to JICA Questionnaire Connected With Integrated Liquefied Petroleum Gas Project, Phase III

1. In response to the Inception Report submitted by JICA for the Feasibility Study on the Integrated Liquefied Petroleum Gas Project (Phase III), the Petrochemical Industries Corporation (PIC), the Executing Agency for the Project, has submitted herewith answers to questionnaires as well as explanations to the salient points with a view to assisting the Study Mission to calculate the feasibility of the Project.

2. In addition to the series of discussions held between the Mission and the various Corporations of the Burmese Government, namely the Myanma Oil Corporation (MOC), the Electric Power Corporation (EPC), and the Technical Services Corporation (TSC), the Mission was given the opportunity of visiting the Syriam Refinery and Syriam Terminal, the Cement Mill and Cement Jetty at Kyangin, the Gas Turbine Power Plant at Myanaung, the Gas and oil fields at Myanaung, Shwepyitha and Htantabin, and the construction sites of the Methanol Plant and Methanol Jetty at Seiktha.

3. To enable the Mission to obtain understanding of the Burmese Industrial Development Plan and Energy Usage, the Mission was provided with a copy of "Report to the Phithu Hluttaw, 1985/86.

4. The Mission and the Burmese Side had agreed in principle to the following points:-

4.1 The capacity of the Phase III LPG Plant shall be 50 Million Standard Cubic Feet per day.

4.2 The available Associated Gas will be from Myanaung, Shwepyitha and Htantabin Fields.

4.3 Lean Gas from the Extraction Plant shall be fed by pipeline to Kyangin Cement Mill, Myanaung Gas Turbine Power Station and Seiktha Methanol Plant.

4.4 A new gas line spanning through Shwepyitha, Myanaung and Htantabin shall be laid for feed associated gas to the Phase III Plant.

4.5 A new Electric Power Transmission line shall be installed between the Myanaung Power Station and the LPG Plant, as well as the branch lines to the LPG Terminal and LPG Jetty.

4.6 The net storage capacity of the LPG Terminal shall be on the basis of production volume for 15 days as regards LPG Terminal Site and 20 days as regards Syriam Terminal.

4.7 According to the results of actual site surveys, the provisional site for LPG Plant is to be on Kyangin North and provisional site for Terminal and Jetty sites are to be on Kyangin South. Confirmation shall be concluded after detailed study.

4.8 Infrastructure facilities such as electric power supply and water supply for a housing complex of 300 families shall be included in the scope of the Project.

4.9 The method of transportation of LPG from the Phase III Plant to Syriam Terminal is to be by self-powered LPG Barges, capable of carrying 600 tons or more of LPG per load. The total number of such barges is to be 3 (three).

4.10 The method of transportation of Naphtha from the LPG Plant to LPG Terminal is to be by pipeline. From the LPG Terminal Naphtha will be transported by oil barges either to Syriam or elsewhere. The barges for such transportation is outside the scope of the Project.

4.11 The prices of LPG and Naphtha per metric ton basis is to be as follows for purposes of economic evaluation:-

	FOB Export Price	Domestic Price
1. Propane	US$ 140	Ks. 2,000
2. Butane	US$ 140	Ks. 1,550
3. Naphtha	US$ 225	Ks. 1,120

4.12 Some of the construction machinery required for Phase III construction could be obtained from the presently useable fleet belonging to PIC. However, spare parts will be required to enable those machines to operate efficiently.

4.13 PIC requested the Mission to include suitable river craft, landing craft type (Z-craft) of 100 ton capacity so that materials could be transported by Irrawaddy River from Rangoon to Kyangin Area and also suitable river launch to ferry light materials and personnel between the East bank and West bank of the Irrawaddy river as there are no bridges crossing the river at Kyangin Area. This would have favourable impact on implementation schedule of the Project.

4.14 The communication network between the LPG Plant, Terminal, Jetty, Feed Gas Producer and Lean Gas End User will have to be established either by utilizing the existing public telephone network and/or by installing wireless-telephone systems and carrier-telephone. Provision of such a network shall be in the scope of the Project.

4.15 PIC and JICA discussed financial and economic matters on the Phase III study, and PIC gave answers to questionnaires. PIC and JICA agreed that the study basis on financial and economic analysis on the Phase III Project shall be according to the study premises.

4.16 PIC and JICA agreed to have the Project implementation sites named as follows:-

(a) Kyangin LPG Extraction Plant

(b) Kyangin LPG Terminal

(c) Kyangin LPG Jetty

4.17 It agreed feed gas specification for design base shall be as per PIC's reply to questionnaires.

Annexure 3

LIST OF MEMBERS

LIST OF MEMBERS

JAPANESE SIDE:

Mr. Tetsuhiko TSUNODA	: Study Team Leader Project Management
Mr. Muneteru YOSHIZAWA	: Process and Transportation
Mr. Akira NAGUMO	: Civil and Infrastructure
Mr. Masatoshi HARADA	: Construction Cost and Operating Plan
Mr. Shinji IZUME	: Marketing
Mr. Saburo MIZUNO	: Electric Transmission-line
Mr. Masaaki AWAMOTO	: Project Economist
(Mr. Yuusuke KITAMURA	: Advisor JICA H/Q)

BURMESE SIDE:

P.I.C. (Head Office)

U TIN MAUNG AYE	: Managing Director
U THAN WIN	: Director (Planning)
U HTUN AUNG	: Director (Production)
U TIN HLA	: Director (Finance)
U HLAING MYINT SAN	: Deputy Director (Planning)
U MYA PE	: Asst. Director (Finance)
U KYAW WIN MAUNG	: Head of Dept. (Planning)
U AUNG HTUT	: Head of Dept. (Planning)

P.I.C. (Syriam Refinery)

U MYINT AUNG	: General Manager
U KYAW SEIN	: Deputy General Manager (Production)
U NGWE	: Deputy General Manager (Planning)
U SAN TIN	: Engineer

T.S.C. (Head Office)

U HLA MYINT	: Director
U THEIN WIN	: Deputy Director (Works Planning)
U MYINT THEIN	: Deputy Project Engineer
U THAN NGWE	: Assistant Engineer (Civil)

M.O.C. (Head Office)

U TIN NYUNT	: General Manager (Exploration)
U SAW AUNG HLAING	: Production Superitendent
U SEIN HLAING	: Development Geologist
U MIN ZAW	: Deputy Production Superitendent

M.O.C. (Kyangin Field Site)

U AUNG MYINT	: Manager
U MIN ZAW	: Deputy Production Superitendent
U BO	: Senior Production Engineer
U KHIN MAUNG OHN	: Senior Production Engineer

E.P.C. (Myanaung Power Station)

U WIN KYAING	: Acting General Manager
U AYE THEIN	: Mechanical/Maintenance Engineer
U MYINT THEIN	: Electrical Maintenance Engineer

KYANGIN CEMENT FACTORY

U TIN AUNG	: Deputy General Manager
U KYI MAUNG	: Project Manager
U THEIN LWIN	: Project Engineer (Electrical Engineer)

M.O.C. (Shwepyitha Oil Field)

U YE GAUNG	: Drillers-in-Charge
U TINT NAING	: Engineer -in-Charge

M.O.C. (Htantabin Oil Field)

U KYAW KHIN	: Engineer -in-Charge

M.O.C. (Prome Oil Field)

U KYI WIN	: Manager
U MYINT SWE	: Senior Production Engineer
U KHIN MAUNG PUN	: Production Engineer
U WIN SHWE	: Production Engineer

P.I.C. (Seiktha Methanol Plant Site)

U TIN MOE	: Project Engineer (Methanol Factory Project)

APPENDIX – II

SCOPE OF WORK

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY

ON

THE INTEGRATED LIQUEFIED PETROLEUM GAS PROJECT (PHASE III)

IN

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

AGREED UPON BETWEEN

THE JAPAN INTERNATIONAL COOPERATION AGENCY

AND

THE PETROCHEMICAL INDUSTRIES CORPORATION

Tokyo: 22nd: April, 1985

Shinya NAKAI
Leader, Japanese Preliminary
Survey Team

Rangoon: 9th: April, 1985

U Tin Maung Aye
Managing Director
Petrochemical Industries
Corporation

I. Introduction

In response to the request of the Government of the Socialist Republic of the Union of Burma (hereinafter referred to as "GSRUB"), the Government of Japan has decided to conduct a feasibility study on the Integrated Liquefied Petroleum Gas Project (Phase III) (hereinafter referred to as "the Study") in accordance with the laws and regulations in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA") the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan will undertake the Study in close cooperation with the authorities of the Socialist Republic of the Union of Burma.

The present Document sets forth the Scope of Work with regard to the Study.

II. Basic Project Concept Proposed by GSRUB

1. The Integrated Liquefied Petroleum Gas Project (hereinafter referred to as "the Project") is composed of the 3 phases as follows:

Phase I: part one

Installation of one coking plant with capacity of 5,200 B.P.S.D. using topped crude as feedstock at the Syriam Refinery equipped with facilities to produce approximately 8,000 metric tons of internationally acceptable quality liquefied petroleum gas (L.P.G.) in addition to premium motor-spirit, regular motor-spirit, diesel-oil and petroleum coke.

Phase I: part two

(1) Installation of terminals for L.P.G. at Syriam Refinery Complex and Mann Refinery Complex. The terminal at Syriam is to be adequately sized to accomodate 114,000 metric tons on final annual basis as follows.

(i) L.P.G. production from Syriam Refinery (8,000 metric tons)
(ii) Mann Refinery (15,000 metric tons)
(iii) Mann oil-field (30,000 metric tons)
(iv) Htantabin oil field (61,000 metric tons)

(2) The terminal at Syriam is to be equipped to receive L.P.G. from special river crafts (barges) and to load L.P.G. into export tankers.

(3) Procurement of 4 Nos. special river crafts (barges) to enable transport of L.P.G. from terminal at Mann Refinery complex to Syriam terminal.

Phase II:

(1) Installation of one L.P.G. extraction plant with capacity of 24,000,000 standard cubic feet per day (S.C.F.P.D.) using associated gas as feedstock at Mann oil-field.

(2) Installation of L.P.G. pipe line from the Extraction Plant to terminal at Mann Refinery Complex.

Phase III:

(1) Installation of one unit of L.P.G. extraction plant with capacity of 50,000,000 S.C.F.P.D. using associated gas as feedstock at Htantabin, Myanaung and Shwepyitha oil fields.

(2) Auxiliary facilities to receive, store and load L.P.G. production into special river crafts (barges).

(3) Procurement of special river crafts (barges) to enable transport L.P.G. from Htantabin oil field to Syriam terminal.

2. Expected Production of L.P.G. per annum

8,000 metric tons from Syriam Refinery (Phase I: part one)
15,000 metric tons from the Mann Refinery (Phase I: part two)
30,000 metric tons from Mann oil-field (Phase II)
61,000 metric tons from Htantabin oil-field (Phase III)
(total production of L.P.G. per annum is 114,000 metric tons)

III. Objective of the Study

The objective of the Study is to examine the feasibility of Phase III from economic and technical points of view.

IV. Scope of Work

In order to achieve the above objectives, the Study will cover the following aspects:

1. Areas

(1) Syriam (Receiving Main Terminal)

(2) Kyangin North, Kyangin South (Loading Terminal and Jetty Sites)

(3) Kyangin North and Kyangin South (L.P.G. Plant Sites)

(4) Htantabin Oil Field, Myanaung Oil Field, Shwe-pyitha Oil Field (Feedstock Sources)

(5) Seiktha Methanol Plant, Kyangin Cement Mill, Myanaung E.P.C. Power Station (Lean Gas Users)

2. Data Collection

(1) Natural Condition

1) Location
2) Topography
3) Geography

(2) Feed Stock

1) Quantity
2) Quality
3) Composition
4) Price

(3) L.P.G. Production

1) Quantity
2) Quality
3) Composition
4) Price

(4) Storages, Loading Facilities and Transportation

1) Road

2) River

3) Terminals

4) Port

(5) Infrastructure and Utilities

1) Electricity

2) Water

3) Air

4) Others

(6) Present Situation of Phase I and Phase II

3. Conceptual Design

(1) The L.P.G. extraction plant at Kyangin North or Kyangin South

1) Capacity

2) Site

3) Lay-out

4) Facilities including feedstock and lean gas pipelines.

5) Processing

(2) Special river crafts (barges) for transportation of L.P.G.

1) Capacity

2) Quantity

3) Type

(3) The terminals and Jetties at Kyaukpin North or Kyaukpin South and Syriam for L.P.G.

1) Capacity

2) Site

3) Lay-out

4) Facilities

4. Management

5. Marketing

6. Investment and Operating Costs

7. Implementation Schedule

8. Economic and Financial Analysis

9. Overall Evaluation and Recommendations

V. Steps and Schedule of the Study

1. Steps

Step 1: Preparatory Office Work

Step 2: Field Work in Burma

Step 3: Home Office Work in Japan

Step 4: Presentation of and Discussion on the Draft Final Report

2. Schedule

As shown in Annexure I.

VI. Reports

JICA shall prepare and submit the following reports written in English to GSRUB.

1. Inception Report at the begining of Step 2: 5 copies
2. Progress Report at the end of the Step 2 : 10 copies
3. Draft Final Report and its summary within 2 ½ (two and one half) months after commencement of the step 3 : 20 copies
4. Final Report and its summary within 1 ½ (one and one half) months after the receipt of comments on the Draft Final Report by P.I.C. : 50 copies

VII. Undertaking of GSRUB

1. To facilitate smooth conduct of the Study, GSRUB shall take necessary measures:

   (1) to secure the safety of the Japanese study team

   (2) to permit the members of the Japanese study team to enter, leave and sojourn in Burma for the duration of their assignment therein, and exempt from alien registration requirements and consular fees

   (3) to exempt the members of the Japanese study team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into Burma for the conduct of the Study

(4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study

(5) to provide necessary facilities to the Japanese study team for the remittances as well as utilization of funds introduced into Burma from Japan in connection with the implementation of the Study

(6) to provide the medical services as needed and its expenses will be chargeable on the members of the Japanese study team

(7) to secure permission to take all data and all documents related to the Study out of Burma to Japan by the Japanese study team.

2. GSRUB shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.

3. PIC shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. PIC shall, at its own expense, provide the Japanese study team with the following, in cooperation with other agencies concerned, if necessary:-

(1) available data and information related to the Study
(2) counterpart personnel
(3) suitable office with necessary equipment in PIC
(4) credentials of identification cards
(5) chauffeured vehicles

VIII. Undertaking of the Government of Japan

For the implementation of the Study, the Government of Japan shall take necessary measures through JICA:

1. to dispatch, at its own expense, study team to the Socialist Republic of the Union of Burma
2. to pursue technology transfer to the Burmese counterpart personnel in the course of the Study

IX. Mutual Consultation

JICA and PIC will consult with each other in respect of any matter that is not agreed upon in this document and may arise from or in connection with the Study.

Annexure I

Tentative Schedule of the Study

Item \ Period	1	9	8	5			
	April	May	June	July	August	September	October
Preparatory Office Work (Step 1)	▭						
Field Work (Step 2)		▭					
Home Office Work (Step 3)			▭	▭	▭		
Presentation of Draft Final Report (Step 4)					▭		
Submission of Final Report							△

▭ in Japan

▭ in Burma

APPENDIX – III

EVALUATION OF EXPANDER PROCESS IN LPG RECOVERY PLAN, PHASE III

APPENDIX III. EVALUTATION OF EXPANDER PROCESS IN LPG RECOVERY PLAN, PHASE III

1. LPG Recovery Process

The followings are types of LPG recovery process in worldwide use at present:

(1) Absorption
(2) Refirgerated absorption
(3) Refrigeration
(4) Conpression
(5) Adsorption
(6) Cryogenic Joule Thomson
(7) Cryogenic expander
(8) Complex type of the above processes (1) – (7)

2. Study on LPG Recovery Process Under Phase III

2.1 Object Process of Study

The processes involving the most advanced high technology are selected as follows among various types of LPG recovery process, and placed under the object of study by the reques request of Burmese Side.

(1) Refrigerated absorption method ..... base case
(2) Cryogenic expander and refrigerated abosroption complex ... Case 1
(3) Cryogenic expander method ..... Case 2

2.2 Preconditions

(1) *Plant capacity*

Feed gas processing volume ..... 50×10^6 SCFD

(2) Compositions of feed gas

(Based on Japanese Preliminary Survey Team's report for The Integrated LPG Project Phase III, Aug. 1984. Composit feed gas of Htantabin 80% and Shwepyitha 20%)

O_2	0.02	MOL %
CO_2	0.80	"
C_1	86.14	"
C_2	5.36	"
C_3	4.26	"
C_4	2.76	"
C_5	0.53	"
C_6^+	0.13	"
	100.00	

(3) Receivable conditions of feed gas

Pressure	28 kg/cm^{2}g
Temperature	38°C

(4) Deliverable conditions of lean gas

Pressure	35 kg/cm^{2}g

2.3 Process Flow

Fig. A-1 – A-2 show Block Flow Diagrams of respective three process systems placed under study object.

Applicable location of th expander in each process of Case 1 and Case 2 is a gas side where the gas is separated from condensed liquid (a location at the final cooling stage) after it has departed from dehydration section, deprived of cold-heat and cooled off through heat exchange, and frozen by a propane refrigeration system.

Recovery method of dynamic power of the expander is by a compression driver

for pressurizing lean gas.

Temperatures at the final cooling stage of feed gas are as follows:

(1) Base case −35°C

(2) Case 1 −55°C

(3) Case 2 −77°C

Features in Material flow in each process are shown in Block Flow Diagrams.

2.4 Yield of Products and LPG Recovering Rate

Type of Process	Ref. Absorber (Base case)	Expander + Absorber (Case -1)	Expander (Case -2)
Lean Gas	49,150 Nm^3/H [0]	48,617 Nm^3/H [▼ 533 Nm^3/H]	48,350 Nm^3/H [▼ 800 Nm^3/H]
C_3 LPG	32,670 T/Y [0]	34,155 T/Y [△ 1,485 T/Y]	32,733 T/Y [△ 63 T/Y]
C_4 LPG	31,767 T/Y [0]	31,894 T/Y [△ 127 T/Y]	31,577 T/Y [▼ 190 T/Y]
LPG Total	64,437 T/Y [0]	66,049 T/Y [△ 1,612 T/Y]	64,310 T/Y [▼ 127 T/Y]
C_3 Yield	88%	92%	88%
C_4 Yield	98%	98%	97%

2.5 Utility Consumption

Electric power consumption, which commands major part of utilities, is as shown below. Since difference between each case is negligible, descriptions of other utilities are omitted. The fuel for gas turbine to the compressor driver for feed gas and pressurizing lean gas are part of the lean gas produced in the process.

	R.A (Base Case)	Expander (Case-1)	Expander (Case-2)
Electric Power Consumption	3,300 kWh/H	2,600 kWh/H	2,000 kWh/H
	[Base]	▼ 700 kWh/W	▼ 1,300 kWh/H

2.6 Systems Consisting of Process and Capacity of Major Equipment

	R.A System (Base Case)	Expander (Case-1)	Expander (Case-2)
Process Unit			
i) Charge Gas Comp.	1,310 kW	→	2,032 kW
ii) Lean Gas Comp.	933 kW	1,746 kW	2,485 kW
(Gas Turbine)	(2,243 kW)	(3,056 kW)	(4,517 kW)
	2,500	3,500	4,850
iii) Expander Comp.	–	522 kW	730 kW
(Expander)		(529)	(752)
iv) Absorber	Exists	Exists	None
Hot Oil System	9.3 MMkcal/h	9.7 MMkcal/h	7.4 MMkcal/h
C_3 Ref. System	2.5 MMkcal/h	1.7 MMkcal/h	1.1 MMkcal/h
Cooling Water System	2,500 T/H	2,200 T/H	1,800 T/H
Power Receiving	5,000 kVA	4,000 kVA	4,000 kVA

2.7 Comparison of Construction Cost

(Unit: ¥100 million)

	R.A System (Base case)	Expander (Case-1)	Expander (Case-2)
Rotary Machinery Compressor Gas Turbine Expander	Base	+ 2.9	+ 3.7
Absorber System	Base	0	- 0.6
Hot Oil System	Base	0	- 0.2
C_3 Ref. System	Base	- 0.5	- 0.8
Cooling Water System	Base	- 0.1	- 0.2
Power Receiving	Base	- 0.1	- 0.1
Others	Base	+ 1.7	+ 0.8
Total	Base	+ 3.9	+ 2.6

2.8 Economic Evaluation

(1) Assumption of economic evaluation

A. Unit price

o	Electricity	0.12 Kyat/KWH
o	Lean gas	1.8 Kyat/1,000 SCF
o	LPG	140 US$/T
o	Transportation	60 Kyat/T (Kyangin – Rangoon)

B. Exchange rate

Kyat/US$	8.6
Kyat/¥100	3.5

C. Where the three processes are compared in maintenance cost, Ten (10)% of construction cost shall be estimated annually. Difference of cost between all other facilities is deemed negligible.

	Base case	Case 1	Case 2
Maintenance cost (¥ million/yr.)	Base	+29	+37

D. Interest rate shall be 2.75%/year.

E. Depreciation expense shall set in force from the first fiscal year of twenty year parity depreciation of total amount.

F. Lean gas calorie shall be estimated.

G. Difference of all other cost between each process is considered negligible.

(2) Comparison of individual processes

Simplified method is used for comparison of gross profit.

(Unit: 1,000 kyat/yr.)

	RA system (Base case)	Expander (Case 1)	Expander (Case 2)
Lean gas	Base	- 215	- 323
LPG	Base	+ 1,941	- 153
Transportation	Base	- 97	- 8
Electricity	Base	+ 665	+ 1,236
Facility interest	Base	- 375	- 250
Maintenance cost	Base	- 508	- 648
Depreciation expense	Base	- 682	- 455
Total		+ 729	- 601

2.9 Study

The technique of utilizing expander as a cold-heat generation measure such as Joule Thomson effect has been commonly used since quite a long time ago, however, an expander process, which is incorporated with power recovery system, is being widely used recently to conserve energy. Accoridng to O.G.J. report (July 16, 1984), 326 sets of Cryogenic expanders are being used among 1,367 sets of gas processing plant in the entire world. Where the plant scale is comparatively large, or cold temperature is required for the separation of C_2 fractions, the expander is used to meet these conditions.

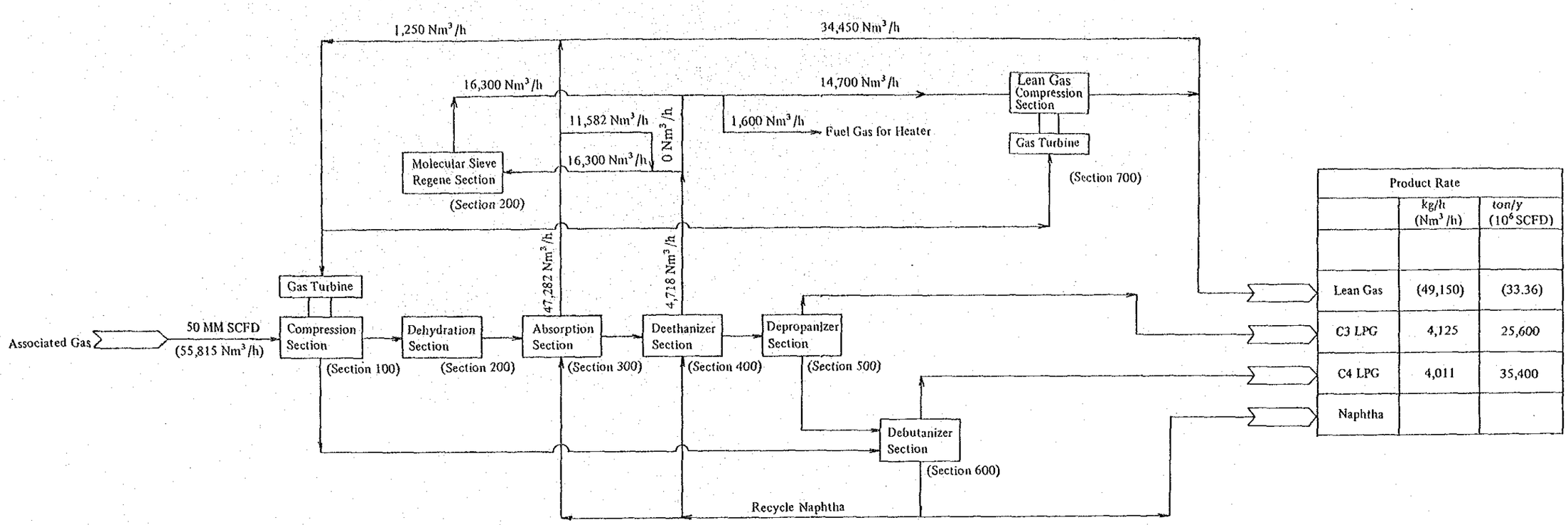
Where 90% or more recovery rate of C_3 LPG is required, Complex process -- combination of Cryogenic expander and absorber system -- will be effective.

Under Phase III Project, comparison of Refrigeration Absorption method of Base case and Cryogenic Expander method of Case 2 shows that the former is more effective than the latter at the level of 88% of C_3 recovery rate.

With the application of complex Expander Absorber process of Case 1, improvement in C_3 recovery rate may be expected, however increase of unit processes and revolving machines are also inevitable that sophisticated technology is required for the operation and maintenance management to cope with such mechanical intricacy. In respect to economic evaluation on the assumptions for this Project, Case 1 is a little more effective than Base case, however, this may be reversed considering the profit difference produced from annual operation days of the plant (a few non-operation days may offset anticipated profit).

C_3 recovery rate at concept designing under this Project is 90%, which is more than equal to the worldwide level of gas processing plant when compared, and is considered quite appropriate in both quality and quantity balance for lean gas supplying.

Consequently, we would like to recommend that Refrigerated Absorption Process is the most appropriate method for the process under Phase III LPG recovery project because of its comparatively easy operation and maintenance management.

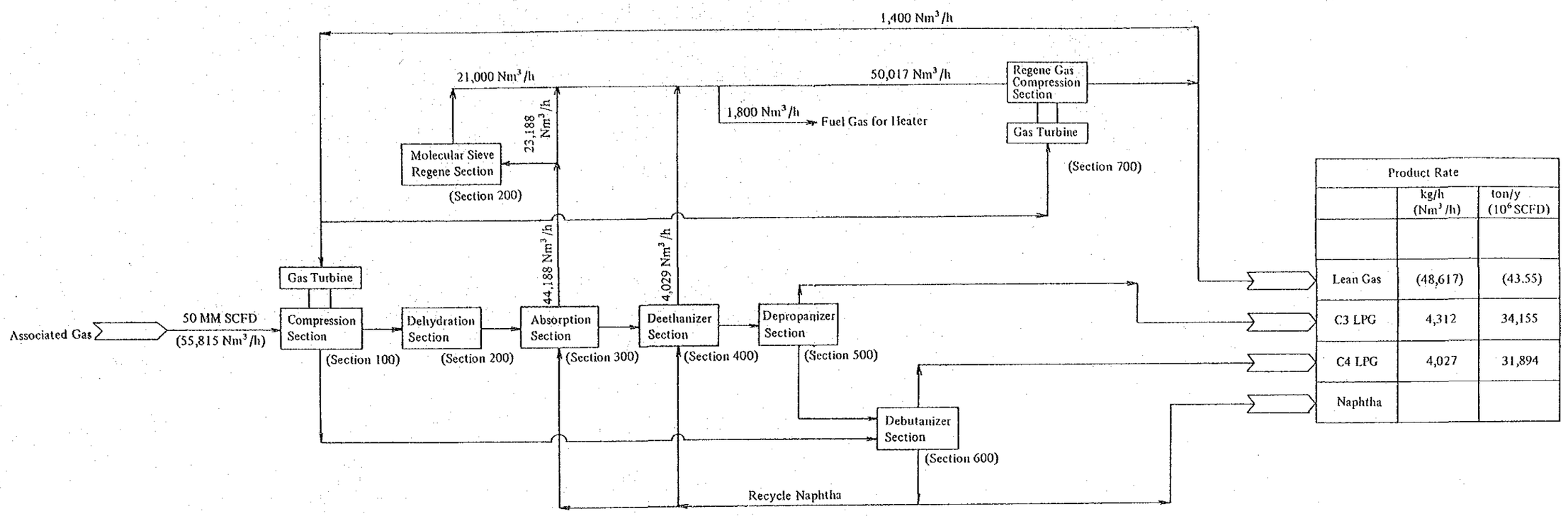


Product Rate		
	kg/h (Nm³/h)	ton/y (10⁶ SCFD)
Lean Gas	(49,150)	(33.36)
C3 LPG	4,125	25,600
C4 LPG	4,011	35,400
Naphtha		

Remarks

1. Operation service factor : 330 days/year
2. Gas flow rate is shown at regenerating operation of molecular sieve.
3. Feed gas flow rate is dry base.
4. AG composition
   - N_2 : 0.00 mol %
   - O_2 : 0.02 mol %
   - CO_2 : 0.88 mol %
   - C_1 : 86.14 mol %
   - C_2 : 5.36 mol %
   - C_3 : 4.26 mol %
   - C_4 : 2.76 mol %
   - C_5 : 0.53 mol %
   - C_6^+ : 8.13 mol %

Fig. A-1 RA System (Base Case)

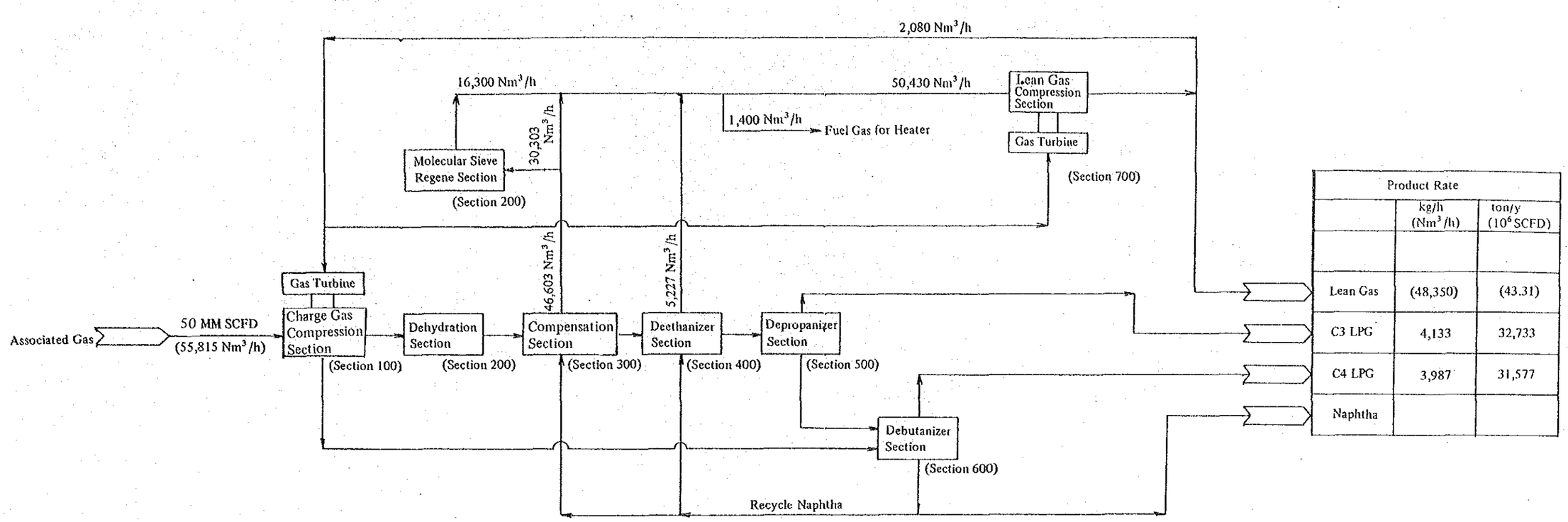


Product Rate		
	kg/h (Nm^3/h)	ton/y (10^6 SCFD)
Lean Gas	(48,617)	(43.55)
C3 LPG	4,312	34,155
C4 LPG	4,027	31,894
Naphtha		

Remarks

1. Operation service factor : 330 days/year
2. Gas flow rate is shown at regenerating operation of molecular sieve.
3. Feed gas flow rate is dry base.
4. AG composition
   - N_2 : 0.00 mol %
   - O_2 : 0.02 mol %
   - CO_2 : 0.88 mol %
   - C_1 : 86.14 mol %
   - C_2 : 5.36 mol %
   - C_3 : 4.26 mol %
   - C_4 : 2.76 mol %
   - C_5 : 0.53 mol %
   - C_6^+ : 8.13 mol %

Fig. A-2 Expander Process (Case-1)



Product Rate		
	kg/h (Nm³/h)	ton/y (10⁶ SCFD)
Lean Gas	(48,350)	(43.31)
C3 LPG	4,133	32,733
C4 LPG	3,987	31,577
Naphtha		

Remarks

1. Operation service factor : 330 days/year
2. Gas flow rate is shown at regenerating operation of molecular sieve.
3. Feed gas flow rate is dry base.
4. AG composition
   - N_2 : 0.00 mol %
   - O_2 : 0.02 mol %
   - CO_2 : 0.88 mol %
   - C_1 : 86.14 mol %
   - C_2 : 5.36 mol %
   - C_3 : 4.26 mol %
   - C_4 : 2.76 mol %
   - C_5 : 0.53 mol %
   - C_6^+ : 8.13 mol %

Fig. A-3 Expander Process (Case-2)

APPENDIX – IV

SUMMARY OF DISCUSSIONS

SUMMARY OF DISCUSSIONS

F O R

THE FEASIBILITY STUDY REPORT (DRAFT)

ON

THE INTEGRATED LPG PROJECT (PHASE III)

IN

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

The Japanese Study Team (the Team) led by Mr. TETSUHIKO TSUNODA organized by the Japan International Cooperation Agency (JICA) visited The Socialist Republic of the Union of Burma from 24th: to 31st: August 1985 and presented to the Petrochemical Industries Corporation (PIC) six (6) copies of draft final report entitled "THE FEASIBILITY STUDY REPORT ON THE INTEGRATED LPG PROJECT (PHASE III) IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA".

During its stay in the Socialist Republic of the Union of Burma, the Team explained the above-mentioned report and had a series of discussions with the Burmese authorities concerned for the Project.

The followings are the summary of the meetings and discussions:

1. Participants at the Discussions:

(a) Petrochemical Industries Corporation

(i) U Tin Maung Aye, Managing Director

(ii) U Than Win, Director (Planning)

(iii) U Tin Hla, Director (Finance)

(iv) U Hlaing Myint San, Deputy Director (Planning)

(v) U Kyaw Win Maung, Head of Dept. (Planning)

(b) Myanma Oil Corporation

(i) U Tin Nyunt, General Manager (Exploration)

(c) Technical Services Corporation

(i) U Hla Myint, Director (Implementation)

(d) Electric Power Corporation

(i) U Than Tin, Assistant Chief Engineer

(ii) U Hla, Superintending Engineer

(e) J.I.C.A. Team

(i) Mr. Tetsuhiko Tsunoda, Team Leader

(ii) Mr. Muneteru Yoshizawa, Process and Transportation

(iii) Mr. Masaaki Awamoto, Project Economist

(iv) Mr. Yoshio Yabe, Advisor J.I.C.A. H/Q

2. Subjects of the Discussions:

2.1 Presentation of the captioned report (draft final) and summarized explanation in general were made by the Team to the Burmese side on 26th:, 27th:, 28th:, and 29th: August, 1985.

2.2 Discussions were made during those days and confirmed points thereof are recorded in paragraph 3 hereinafter.

3. Confirmation

In the course of discussions for the Draft Final Report, the following points were mutually confirmed by both parties.

3.1 The Feasibility Report has been prepared according to the Scope of Work for the Feasibility Study on the Integrated Liquefied Petroleum Gas Project (Phase III), dated 9th: April 1985 (Rangoon) and 22nd: April 1985 (Tokyo).

3.2 The technical analysis regarding the availability of feedstock for the proposed 50 x 10^6 SCFD capacity

LPG Extraction Plant; the analysis of required ancillary facilities thereto (Terminals, Jetty, LPG Transportation Barges, Offsites and Construction Machinery), and the analysis of Electric Power requirement for the Project have been fully covered in the report.

3.3 Analysis of the export trend of LPG from Burma, as well as the operational method of performing such export through the Syriam Terminal and Jetty, have been well covered in the Report, proving that it is physically possible to export 96,900 T/Y of LPG, the total products from Syriam Coker (5,900 T/Y), Mann GOCS (30,000 T/Y) and Kyangin Plant (61,000 T/Y).

3.4 However, analysis of export operation from Syriam Terminal has also shown that 20 days per month are necessary to lift 96,900 T/Y of LPG, leaving 10 days extra per month. During this period, it is possible to accommodate 13,000 T/Y from Mann Refinery for additional export if necessary. Hence the total LPG export possible through Syriam Terminal is around 109,900 T/Y. The detailed analysis is as per Annexure I.

3.5 The analysis of the financial aspects of the Project has taken into consideration the three different methods of financing, viz, Base Case with annual interest rate of 2.75% and terms of repayment as 30 years (including 10 years grace period), Case A with the interest rate of 5.0% per annum and terms of repayment as 10 years, and Case B with the interest rate of 7.8% per annum and terms of repayment as 10 years. It has been clearly

shown that the Base Case is the only alternative for making the Project feasible.

3.6 The draft final report, apart from correction of certain typographical errors and omission of certain extraneous sentences, has been agreed to by both parties and no significant changes are necessary. However, in Chapter 2, Page 12, "Financial Analysis", the following paragraphs shall be added:-

(a) The IRROI after contribution to state of the Project is 5.11%. This indicates that the profitability of the Project itself may not be so high, but not so desperately low. However, the IRROE after contribution is 34.32%, if capital procurement under the soft financing conditions of long term loan presumed in this report is affirmative.

(b) The position of funds and financial situation of the Project are sound and hence the Project is financially viable.

Similarly, in page 13 of the same Chapter and under "Economic Analysis", the following paragraph shall be added:-

The EIRR is 7.20% which is better than 5.11% of the IRROI after contribution to state but is slightly lower than 7.90% of the IRROI before contribution to state in the financial analysis. The implementation of the Project will contribute immensely to the Burmese Economy, by earning foreign exchange amounting to US$ 90532000 as direct economic benefits

over the entire project life. Furthermore, a number of indirect economic benefits are also concieved. As results of the above benefits, the project will make a high overall economic effect, and therefore the Implementation of the project is suggested itself to proceed positively.

4. Final Report

The Final Report on the Feasibility Study shall be prepared by the Team and presented to the Burmese side in due course covering the points specified in paragraph 3.6 above.

The Draft Final Report including the above-mentioned points was mutually confirmed and agreed between PIC and the Team on August 30th:, 1985.

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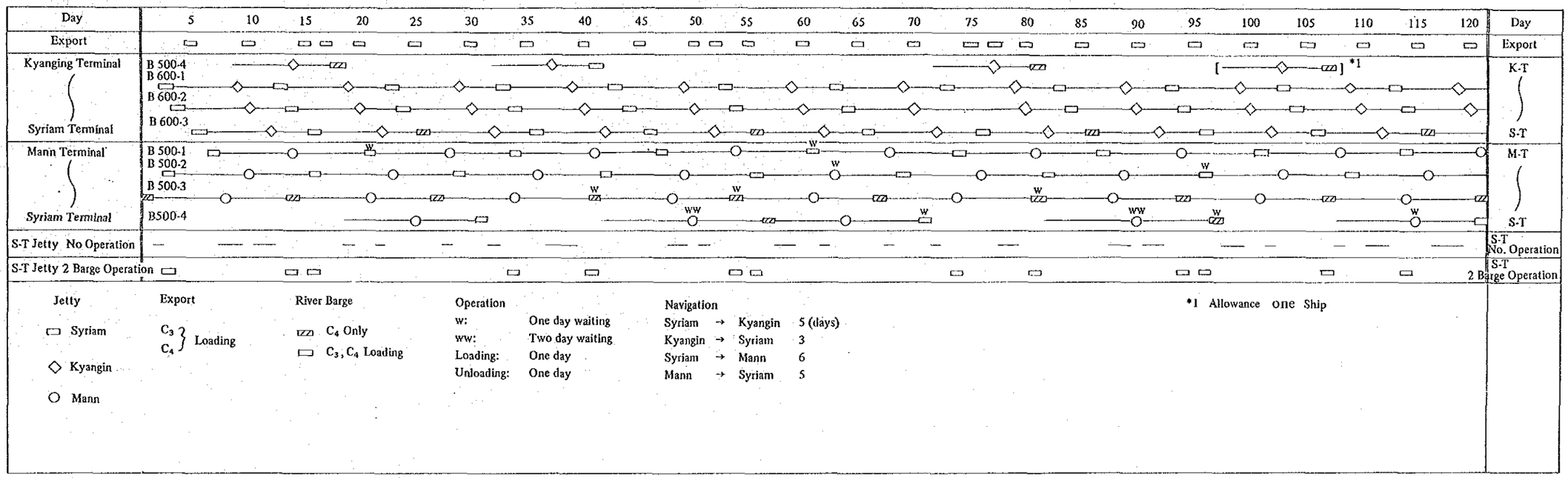
Syriam Terminal LPG Handling Volume

Project Phase	LPG Production Facility	LPG Output	Use		For Export			
			For Export	For Domestic Consumption	C_3 LPG		C_4 LPG	
					T/Y	T/SD	T/Y	T/SD
Phase I part 1	Syriam Refinery Cokey LPG Plant	6,900	6,900	–	2,300	7.0	4,600	13.4
Phase I part 2	Mann Refinery	13,500	12,000	1,500	2,400	7.3	9,600	29.1
Phase II	Mann GOCS Extraction Plant	30,000	30,000	–	11,200 (13,600)	33.9 (41.2)	18,800 (28,400)	57.0 (86.1)
Phase III	Kyangin LPG Extraction Plant	61,000	61,000	–	25,600	77.6	35,400	107.3
		111,400	109,900	1,500	41,500		68,400	
Syriam Terminal LPG Handling Volume		109,900 (T/Y)						

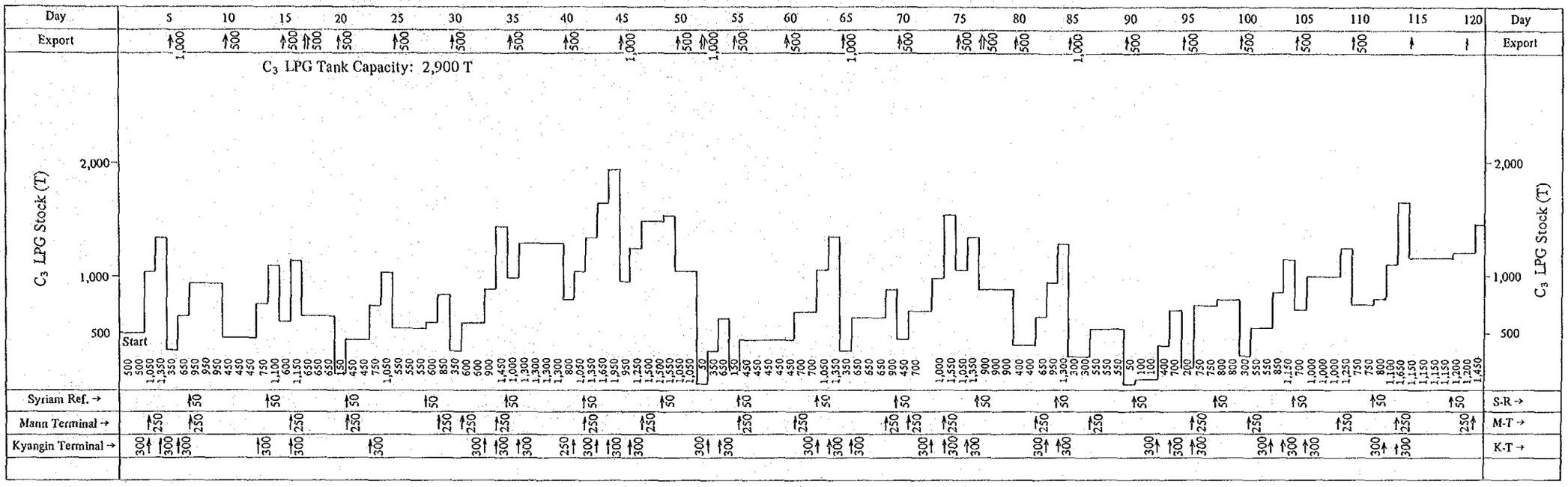
Mean Transportation Frequency

a) Mann Terminal 7.6 ship/M (@ 500 T Barge)
b) Kyanging Terminal 9.2 ship/M (@ 600 T Barge)
c) Export 6.1–6.8 ship/M (@1,500 T Tanker)

Jetty & Barge Operation Schedule Alternate Case (Export: 109,900 T/Y)



C_3 LPG Receiving and Shipping Schedule of Syriam Terminal Alternate Case



C_4 LPG Receiving and Shipping Schedule at Syriam Terminal Alternate Case